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HANDSHAKE WITH THE DRAGON: ENGAGING CHINA IN THE BIOLOGICAL WEAPONS CONVENTION

by

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The 1972 Biological and Toxin Weapons Convention (BWC) currently lacks procedures for verifying compliance of signatories; this shortcoming, in combination with advances in biotechnology and a changing global security environment have resulted in the continued proliferation of biological and toxin weapons (BTW.) Efforts to strengthen the BWC with an inspection protocol have been hampered by disagreement over intrusive inspection and the threat it poses to national security and industrial competitiveness. Debate within the United States, however, fails to consider the impact of U.S. involvement in the inspection regime on the behavior of signatories such as China which are suspected to be violating the treaty. Michael Swaine's model of Chinese government decision making is used to evaluate reactions to three U.S. policies toward BWC inspections. Research suggests that responsibility for BWC verification overlaps institutional interests and that U.S. participation in the protocol may have a positive effect in the Chinese cost-benefit calculation of accepting inspections. Findings suggest that one way of encouraging nations such as China in nonproliferation efforts may be to push forward and accept intrusive inspections, with an understanding of their limitations and costs.

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HANDSHAKE WITH THE DRAGON: ENGAGING CHINA IN THE BIOLOGICAL WEAPONS CONVENTION

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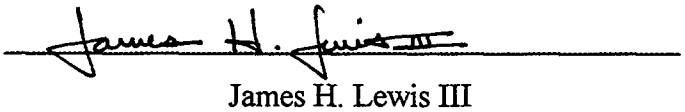
Author: 

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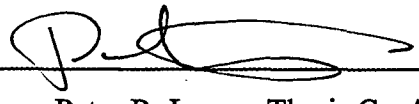
Approved by: 

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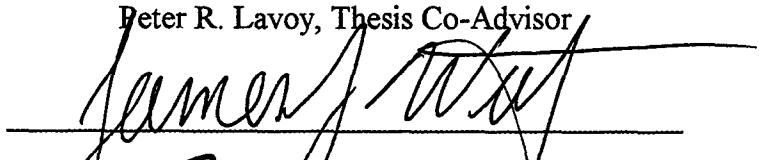

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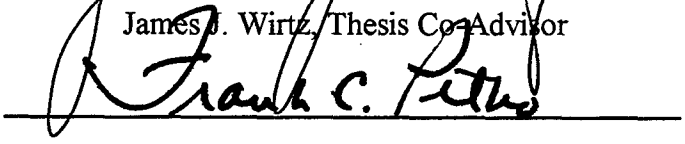

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ABSTRACT

The 1972 Biological and Toxin Weapons Convention (BWC) has failed to control the global proliferation of biological and toxin weapons (BTW). The BWC lacks procedures for verifying compliance of signatories. This shortcoming, in combination with advances in biotechnology and a changing global security environment, makes BTW an attractive weapon for developing nations and non-state actors.

A decade-long effort to strengthen the BWC with an inspection protocol, has been hampered by disagreement over intrusive inspection and the threat posed to national security and industrial competitiveness. Current debate within the United States over the costs and benefits of BWC verification fails to consider the impact of U.S. involvement in the inspection regime on the behavior of other signatories, especially nations such as China which are suspected of violating the BWC.

Michael Swaine's model of Chinese government decision making is used to evaluate reactions to three U.S. policies toward BWC inspections. Research suggests that within the Chinese bureaucracy, responsibility for BWC verification overlaps institutional interests of security, economics, and foreign policy. I show that U.S. participation in the protocol will affect the Chinese calculation of the costs and benefits of accepting an inspection regime. U.S acceptance of inspections raises the level of Chinese benefits at least to the level of their perceived costs and may encourage more responsible nonproliferation policy. With U.S. inaction or rejection of BWC inspections, Chinese perceived costs of accepting inspections exceed the possible benefits.

If the United States is serious about internationalizing nonproliferation efforts, the administration needs to consider the effect of U.S. policy on the BTW and BWC policies of other Conference members. One way of encouraging China in nonproliferation efforts may be to push forward and accept intrusive inspections, with an understanding of their limitations and costs, as part of a BWC compliance protocol.

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LIST OF ABBREVIATIONS

ACDA	Arms Control and Disarmament Agency
AG	Australia Group
AHG	Ad Hoc Group of Governmental Experts
AMS	Academy of Military Science
APEC	Association of Petroleum Exporting Countries
ARF	ASEAN Regional Forum
ASEAN	Association of Southeast Asian Nations
BL4	Biosafety Level 4
BST	Bureau of Science and Technology
BTW	Biological and Toxin Warfare
BWC	Biological and Toxin Weapons Convention
CBM	Confidence-Building Measure
CCP	Chinese Communist Party
CD	United Nations Conference on Disarmament
CDSTIC	China Defense Science and Technology Information Center
CICIR	China Institute for Contemporary International Relations
CMC	Central Military Commission
CMC GO	CMC General Office
CNS	Comprehensive National Strength
COSTIND	Commission on Science, Technology and Industry for National Defense
CPMIEC	China Precision Machinery Import-Export Corporation
CTBT	Comprehensive Test Ban Treaty
CWC	Chemical Weapons Convention
DNA	Deoxyribonucleic Acid
DP	Defense Policy
FALSG	Foreign Affairs Leading Small Group
GATT	General Agreement on Tariffs and Trade
GCD	General and Complete Disarmament
GPD	General Political Department
GLD	General Logistics Department
GSD	General Staff Department
HUMINT	Human Intelligence
IIS	Institute for International Studies
IPR	Intellectual Property Rights
MAS	Ministry of Aerospace Industry
MFN	Most-Favored-Nation
MID	Military Intelligence Department
MIE	Military Industrial Enterprises
MoFA	Ministry of Foreign Affairs
MoFTEC	Ministry of Foreign Trade and Economic Cooperation
MOU	Memorandum of Understanding
MMB	Ministry of Machine-Building
MMI	Ministry of Machine Industry

MPS	Ministry of Public Security
MSS	Ministry of State Security
MTCR	Missile Technology Control Regime
NAG	Non-Aligned Group of Nations
NDU	National Defense University
NPT	Nuclear Non-proliferation Treaty
NSO	National Strategic Objectives
OFA	State Council Office of Foreign Affairs
OOTW	Operations Other Than War
PBSC	Politburo Standing Committee
PCR	Polymerase Chain Reaction
PhRMA	Pharmaceutical Research and Manufacturers of America
PLA	People's Liberation Army
PLAAF	PLA Air Force
PLAN	PLA Navy
PRC	People's Republic of China
RNA	Ribonucleic Acid
RPV	Remotely Piloted Vehicle
SIIS	Shanghai Institute for International Studies
SRAI	Strategic Research, Analysis, and Intelligence
UNSCOM	United Nations Special Commission
USTR	U.S. Special Trade Representative
VEREX	Verification Experts
WMD	Weapons of Mass Destruction

EXECUTIVE SUMMARY

Efforts to control the use and proliferation of biological and toxin weapons (BTW) can be traced to the 1925 Geneva Protocol and 1972 Biological and Toxin Weapons Convention (BWC). These agreements have not been completely effective because they lack a mechanism to verify compliance. Changes in the international security environment over the last decade, in combination with technical advances in biotechnology, have made BTW an increasingly attractive weapon for developing nations and substate groups.

Negotiations to strengthen the BWC with an inspection protocol to confirm compliance are ongoing in Geneva. While a "rolling draft" proposal addressing procedures for compliance monitoring exists, members of the Convention remain split over the issue of intrusive inspections. Debate in the United States is divided between arms control advocates, who believe inspections will be useful in promoting compliance and detecting violations, and those who argue that the nature of BTW and their production make verification impossible and pose serious risks to U.S. industrial competitiveness. Neither side, however, explicitly considers the likely effects of U.S. participation in inspections on the behavior of other Convention parties – especially those in violation of the BWC.

The People's Republic of China (PRC) presents U.S. policy makers with a dilemma. Despite its membership in the BWC since 1984 and an official policy denying possession of BTW, U.S. intelligence agencies suspect that the Chinese maintain an offensive BTW program. Limiting the further proliferation of WMD, and especially

BTW, is an important priority for the United States and its allies. It is therefore important to consider the likely impact of U.S. participation in a BWC inspection regime on the institutions that formulate Chinese arms control policy.

Michael Swaine's model of Chinese bureaucratic decision making suggests that institutional subarenas formulate different aspects of foreign policy. Nonproliferation policy is one area that overlaps the responsibilities of the defense, foreign policy, and intelligence subarenas, requiring disparate groups to reach consensus. Past behavior of these subarenas shows that each considers different aspects of the external environment when calculating the costs and benefits of a particular policy. Ongoing negotiations in the BWC and its pending inspection protocol bring interests of the defense policy, foreign policy, and strategic research, analysis and intelligence subarenas into conflict. Since U.S. foreign policy alters the constraints and pressures exerted on PRC bureaucratic entities, the course of action that the United States chooses may affect the outcome of Chinese policy.

The U.S. delegation to the BWC lacks a formal position for negotiation of a BWC inspection protocol. Given the incomplete status of the rolling text protocol and the lack of consensus with regard to the utility of intrusive inspection for BWC compliance within the U.S. government, American participation in the BWC is not guaranteed. Three courses of action are available to the United States:

> (1) The protocol could be accepted with an understanding of the limitations of inspection for verifying compliance.
>
> (2) The United States could opt to neither accept nor reject the protocol, allowing negotiations over procedural details to continue.
>
> (3) The United States could reject the protocol altogether.

If the United States agrees to accept the BWC inspection protocol, the costs to the dominant defense subarena may be closely balanced by the benefits in the political, economic, and technological areas. Chinese behavior would be dependent upon the ability of foreign policy leaders to convince their defense counterparts that spillover benefits of continued economic engagement for defense exceed the potential costs of transparency. In the end, the PLA might accept transparency measures in hopes of eventually benefiting from continued trade, investment, and technology transfer that cooperation in arms control facilitates.

The Chinese policy reaction in the last two cases can be predicted with a high degree of certainty. If the United States cannot reach consensus to either accept or reject intrusive inspections as part of a BWC compliance protocol, Chinese delegates will try to prolong negotiations indefinitely. China will likely continue to advocate nonproliferation while circumventing prohibitions of BTW possession and transfer. A non-verifiable BWC best serves Chinese strategic interests. The Chinese would be free to continue clandestine production, while enjoying the economic and political benefits of improving international relations.

American rejection of BWC inspection provisions could adversely affect the interests of the research and intelligence subarena by limiting access to technology and to a lesser degree affect foreign policy institutions by threatening to cool economic and political relations. Without U.S. participation, however, it is unlikely that the PLA could be persuaded to accept inspections. China would likely pursue limited bilateral BTW

agreements, playing lipservice to nonproliferation with the goal of securing economic or technological incentives.

The growth of the PRC and its past record in WMD proliferation necessitate its active involvement in the BWC. If the United States is serious about internationalizing nonproliferation efforts, the only chance of engaging nations like China in the process may be to push forward and implement an inspection protocol. While expensive and not a stand-alone solution to the problem of BTW proliferation, onsite inspections would be a step toward improving the regime, and in the long term may encourage suspected BWC violators, including China, to accept international norms of responsible behavior.

I. INTRODUCTION

A. BACKGROUND

Efforts to control the proliferation of biological and toxin weapons (BTW) can be traced to the 1925 Geneva Protocol and 1972 Biological and Toxin Weapons Convention.[1] These agreements have been unsuccessful because they lack a mechanism to verify compliance. Changes in the international security environment over the last decade, in combination with technical advances in biotechnology have made BTW an increasingly attractive weapon for developing nations and substate groups.

Negotiations to strengthen the BWC with an inspection protocol to confirm compliance are ongoing in Geneva. While a "rolling draft" proposal addressing procedures for compliance monitoring exists, members of the Convention remain split over the issue of intrusive inspections. Debate in the United States is divided between arms control advocates, who believe that inspections will be useful in promoting compliance and detecting violations, and those who argue that the nature of BTW and their production make verification impossible and pose serious risks to U.S. industrial competitiveness. Neither side, however, considers the likely effects of U.S. participation in inspections on the behavior of other Convention parties – especially those in violation of the BWC.

The PRC presents U.S. policy makers with a dilemma. Despite its membership in the BWC since 1984 and an official policy denying possession of BTW, U.S. intelligence

[1]Text of the BWC may be found on the Monterey Institute of International Studies Nonproliferation Center's homepage. Available from http://cns.miis.edu/db/china/bwcorg.htm, Internet.

agencies suspect that the Chinese maintain an offensive BTW program.[2] Limiting the further spread of WMD, and engaging other countries in the nonproliferation effort, are important priorities for the United States. Therefore, it is important to consider the likely effect of U.S. participation in a BWC inspection regime on the arms control policy of nations such as China.

B. METHODOLOGY

Michael Swaine's model of Chinese bureaucratic decision making suggests that institutional subarenas formulate different aspects of foreign policy. Nonproliferation policy is one area that overlaps the responsibilities of the defense, foreign policy, and intelligence subarenas, requiring disparate groups to reach consensus. Past behavior of these subarenas shows that each considers different aspects of the external environment when calculating the costs and benefits of a particular policy. Ongoing negotiations in the BWC and its pending inspection protocol bring interests of the defense policy, foreign policy, and strategic research, analysis and intelligence subarenas into conflict. Since U.S. foreign policy alters the constraints and pressures exerted on PRC bureaucratic entities, the course of action that the United States chooses may affect the outcome of Chinese policy.

The U.S. delegation to the Ad Hoc Group still lacks a formal position for negotiation of a BWC inspection protocol. Within the U.S. government, neither the Defense Department nor intelligence community believes that a BWC verification protocol will provide sufficient compliance information to warrant the risk of possibly

[2] Office of the Secretary of Defense, *Proliferation: Threat and Response* (Washington, D.C.: November 1997), 12.

compromising U.S. defense and trade secrets. U.S. industry, supported by the Commerce Department, fears losing revenues and proprietary information. Officials at the State Department are concerned that the BWC will impinge upon export control policies.[3] The Arms Control and Disarmament Agency and many in the U.S. Congress believe that an inspection protocol may provide useful information, but cannot stand alone to ensure compliance. The only strong believers in the utility of on-site inspections in providing accurate compliance data are staffers on the National Security Council.[4]

Given the incomplete status of the rolling text protocol and the lack of consensus with regard to the utility of intrusive inspection for BWC compliance within the U.S. government, American participation in the BWC cannot be assumed. Three possible courses of U.S. action are possible:

> (1) The United States accepts the protocol with an understanding of the limitations of inspection for verifying compliance.
>
> (2) The United States neither accepts nor rejects the protocol; negotiations over procedural details continue.
>
> (3) The United States rejects the protocol.

The course of action that the United States decides to follow will alter the perceived costs and benefits of BWC inspections for Chinese bureaucracies and could affect the overall direction of the PRC's policy. This relationship is represented in Figure 1.

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[3] Amy E. Smithson, "Man Versus Microbe: The Negotiations to Strengthen the Biological Weapons Convention," in *Biological Weapons Proliferation: Reasons for Concern, Courses of Action*, (Washington, D.C.: Henry L. Stimson Center, January 1998), 119.

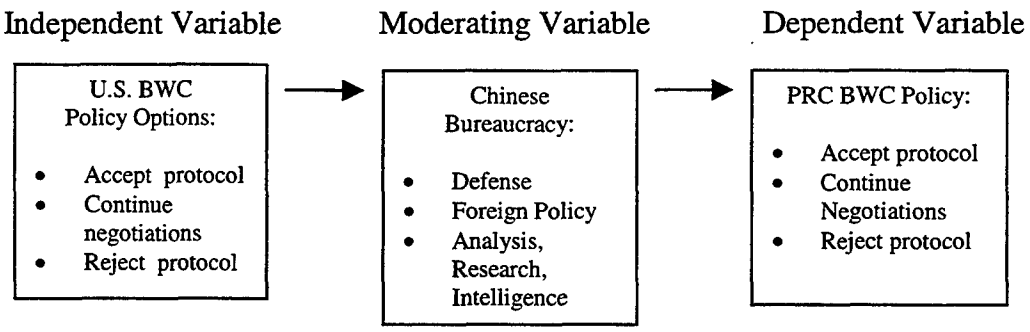

Figure 1. Hypothetical relationship between U.S. and PRC BWC policies

C. THESIS

The paper argues that if the United States accepts the BWC inspection protocol, the costs to the dominant Chinese defense subarena may be less than the benefits in the political, economic, and technological areas. Consensus might be reached to accept transparency measures in hopes of eventually benefiting from continued trade, investment, and technology transfer that cooperation in arms control facilitates.

A non-verifiable BWC also best serves the overall Chinese strategic interest. If the United States cannot reach consensus, or if intrusive inspections are rejected as part of a BWC compliance protocol, China will likely continue to advocate nonproliferation while circumventing prohibitions of BTW possession and transfer.

D. RELEVANCE

A verification protocol for the BWC will be an expensive endeavor requiring long-term funding for inspections and continuous monitoring. Additional expense will be incurred to counter threats to military and industrial secrets. UN Special Commission

[4] Smithson, 119. Information collected by the author in a series of interviews with government officials in Washington, D.C., between 13 and 16 April, 1998, supported Smithson's observations.

(UNSCOM) difficulties in Iraq, however, indicate that reaching international agreement on the format and process of compliance monitoring is important. Verification may prove to be costly, but the expense of military coercion to guarantee inspection team access is a far more arduous task.[5]

The growth of the PRC and its past record in WMD proliferation necessitate its active involvement in the BWC. If the United States is serious about internationalizing nonproliferation efforts, the only chance of engaging nations like China in the process may be to push forward and implement an inspection protocol. While expensive and not a stand-alone solution to the problem of BTW proliferation, onsite inspections would be a step toward improving the regime, and in the long term may encourage suspected BWC violators, including China, to accept international norms of responsible behavior.

E. ORGANIZATION OF THESIS

Chapter II identifies BTW and associated manufacturing techniques, and the unique characteristics of BTW compared to other WMD. Chapter III explores the problem of BTW arms control by tracing past use of BTW, efforts to control their proliferation, and technological advancements responsible for a recent resurgence of interest in their use. Chapter IV discusses efforts to strengthen the BWC, Chinese participation in discussions over verification measures, and introduces the problem of Chinese non-compliance with the BWC. Chapter V outlines the bureaucratic structures involved in Chinese BTW verification policy, and the economic, political, and military

[5]According to George Melloan, the cost of increasing U.S. miltary presence in the Arabian Gulf last fall in response to Iraqi intransigence over UNSCOM inspections was approximately $1

considerations that affect each subarena. Chapter VI concludes by analyzing the potential effects of three courses of U.S. action on BWC verification.

billion. See "Saddam Exploits The Economics of Warfare," *The Wall Street Journal Interactive Edition*, 3 March 1998, available from http://www.wsj.com, Internet.

II. BIOLOGICAL AND TOXIN WEAPONS

The wide variety of biological agents useful in warfare, the dual-use nature of pathogens, and the technical aspects of their manufacture complicate BTW arms control compliance verification, the most crucial element in any arms control regime. These factors highlight the difficulties of negotiating procedures to monitor BWC compliance and the ease in which nations such as China may circumvent treaty requirements in the absence of an inspection protocol.

A. BIOLOGICAL AND TOXIN WARFARE DEFINED

Biological and toxin warfare involves the deliberate use of disease and natural poisons to incapacitate or kill people, domestic animals, and crops. Potential BTW agents include *microorganisms* such as bacteria, rickettsiae, fungi, viruses, and *toxins*, non-living chemicals manufactured by bacteria, fungi, plants, and animals. The potential impact of biological agents in war is highlighted by the fact that throughout history, the inadvertent spread of infectious disease during wartime has caused far more casualties than actual combat.[6]

B. BIOLOGICAL AND TOXIN AGENTS

Not all disease-causing organisms are potential warfare agents. Of the several hundred pathogenic microbes that afflict humans, only about 30 have been considered as likely warfare agents.

1. BTW Classes

The following are classes of biological agents that have military applications:

- *Bacteria* are single-cell organisms that cause anthrax, brucellosis, tularemia, plague, and other diseases. They vary considerably in infectivity and lethality. The bacterium that causes tularemia, for example, is highly infectious, with inhalation of as few as 10 organisms causing disease that is fatal in 30 to 60 percent of those infected within 30 days. Brucellosis has a mortality rate of only 2 percent, but an enormous capacity to incapacitate those infected with fever, chills, and severe fatigue.

- *Rickettsiae* are parasitic organisms that only reproduce inside animal cells. Examples with biological warfare potential include typhus, Rocky Mountain spotted fever, and Q fever. Although occurring naturally in mammals and arthropods such as ticks and lice, these organisms can be disseminated directly through the air.

- *Viruses* are intracellular parasites consisting of a strand of genetic material (DNA or RNA) surrounded by a protective coat that facilitates transmission from one cell to another. Some hemorrhagic fever viruses, such as Lassa or Ebola fever, are exceedingly virulent, with over an 80 percent mortality rate.

- *Fungal pathogens* do not generally cause disease in healthy humans, but can be devastating to crops. Examples of plant fungal pathogens include rice blast, cereal rust, and potato blight, which cause crop losses of 70 to 80 percent.

- A *toxin* is a poisonous substance made by a living system, or a synthetic copy of a naturally occurring poison. A variety of toxins are manufactured by bacteria, fungi, marine organisms, plants, insects, spiders, and animals, and over 400 have been identified to date. After injection, ingestion, or inhalation, they disrupt specific cellular functions such as the transmission of nerve impulses, cellular protein synthesis or other vital physiological functions.

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[6]Office of Technology Assessment (OTA), "Technical Aspects of Biological Weapons Proliferation," *Technologies Underlying Weapons of Mass Destruction* (Washington: U.S. Government: 1993), 71.

Toxins are categorized as either protein toxins, composed of chains of amino acids, or non protein toxins. [7]

Desirable characteristics of a military biological agent include high virulence, a short incubation period between infection and symptoms, minimal contagiousness of the disease from one individual to another, limited immunity within the target population, insusceptibility to medical treatments, ease of production, and the ability to survive environmental stresses such as heat, light, and desiccation during dissemination.[8]

2. Anthrax – BTW of choice

Anthrax, caused by the bacterium *Bacillus anthracis*, is considered the prototypical BTW agent. It is primarily a livestock disease, but also infects humans by contact with infected animals, ingestion of contaminated meat, or inhalation of spores. One gram of anthrax spores contains more than 10^{11} particles. Since the lethal inhalation dose for monkeys is between 10^3 and 10^4 particles, one gram of spores theoretically contains 10 million lethal doses. After inhalation, anthrax spores multiply in the lymph nodes and release toxins which cause fatal hemorrhaging within 4 days if not treated immediately with antibiotics.[9]

In addition to its lethality, anthrax has other characteristics that make it an effective BTW agent. The disease is not contagious from one individual to another. It would therefore not spread far beyond the intended target area or boomerang against the attacker's troops or civilian population, assuming they did not enter a contaminated area. Anthrax is also easy to produce in a modestly-equipped laboratory, and antibiotic-resistant strains have been developed. Finally, when anthrax bacteria are incubated under

[7]OTA, "Technical Aspects of Biological Weapons Proliferation," 80.
[8]Ibid., 77.

particular conditions, they transform into a rugged spore that is stable under a wide range of environmental conditions and that can survive for up to 20 years or longer in soil. This makes anthrax spores particularly well suited for delivery by missiles or bombs, since they can survive explosive dissemination. [10]

C. COMPARISON TO CHEMICAL AND NUCLEAR WEAPONS

Although BTW are often grouped together under the term "weapons of mass destruction" with chemical and nuclear weapons, they differ in important ways that complicate the arms control process and should therefore be considered independently.

BTW agents are extraordinarily lethal, with potency hundreds to thousands of times greater than that of the most lethal chemical warfare agents. One hundred kilograms of anthrax released over a large city could potentially kill one to three million people - results comparable to those of a one-megaton hydrogen bomb.[11] Whereas chemical agents must be stockpiled in the hundreds or thousands of tons to be militarily significant, a few kilograms of anthrax bacteria could cause comparable levels of casualties. To guarantee 50 percent casualties over a one square kilometer area, one metric ton of sarin would have to used, whereas only one gram of anthrax spores, properly dispersed, could inflict the same number of deaths. [12] Such small quantities of agent are much easier to hide and transport.

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[9] OTA, "Technical Aspects of Biological Weapons Proliferation," 79.

[10] Ibid.

[11] Jonathan Tucker, "Putting Teeth in the Biological Weapons Ban," *MIT's Technology Review*, January 1998, 38.

[12] Jonathan Tucker, 24 February 1998 briefing.

Biotechnology is information-intensive rather than capital-intensive, and much of the relevant data is available in published scientific literature. A number of recent developments have also increased the availability of knowledge about developing BTW agents: international telecommunications including the Internet; international exchange programs in advanced biological sciences at U.S. universities; and increased international cooperative efforts to control infectious diseases and advances in genetic engineering.[13] Several "cookbooks" with names like *Silent Death*, *The Poisoner's Handbook*, and *Assorted Nasties* are available over the internet and explain production methods for BTW.[14]

Compared to chemical and nuclear weapons, BTW are extremely cost effective. In a study conducted for the UN in 1969, a panel of experts estimated that to inflict large-scale casualties over a one square kilometer would cost approximately $2000 with conventional weapons, $800 with nuclear weapons, $600 with chemical nerve gas, and only $1 with biological weapons.[15] While these figures are dated, the relative cost differential today would likely be even greater, given advances in biotechnology.

Technologies and material to produce BTW are almost entirely dual use. There is no way to distinguish between efforts to create an offensive capability and those intended for defensive measures, which are permitted under the BWC. In addition, given the fact that many of the infectious diseases associated with BTW are endemic

[13]Ted Procin and David Evans, *Invisible Threat - Visible Responses: A DoD Perspective on Countering the Biological Weapons Proliferation Threat* (Aspen: Aspen Strategy Group, 1996), 3.

[14]See http://www.zyz.com/survivalcenter/bookbs.html, Internet.

[15]Joseph D. Douglass and Neil C. Livingstone, *America the Vulnerable: The Threat of Chemical and Biological Warfare* (Lexingon, Mass.: Lexington Books, 1987), 1.

worldwide, there are legitimate reasons for nations to take advantage of commercially available biotechnology to conduct research into areas directly related to BTW.[16]

Many toxins with potential military applications have genuine therapeutic uses. Plants and bacteria toxins are used to treat a range of medical conditions including neuromuscular disease, cancer, autoimmune disease, and transplant rejection. For example, since the late 1980s, botulinum type A toxin has been used for the treatment of various muscle diseases including blepharospasm, repeated involuntary contraction of the muscles around the eye, and hemifacial spasm. Patients receive small amounts of the toxin by injection into affected muscle groups and the toxin causes near-paralysis of the local muscle fibers for a period of weeks to months. In the United States and Europe, approximately one million patients receive this treatment each year.[17]

Whereas chemical weapons are made from distinctive precursor chemicals that have limited legitimate uses, BTW use pathogens that are usually available domestically for legitimate biomedical research or that exist naturally in soil or diseased livestock. Pathogenic organisms are easily procured through biological repository companies that stock various cultures in frozen and freeze-dried forms. An anthrax culture costs approximately $45 through one U.S. commercial supplier. The only current requirement for purchase is a signed form accepting responsibility for the receipt of the agent and attesting to the existence of adequate facilities to work with pathogenic materials. This end-user certificate requirement, however, can be easily circumvented.[18]

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[16]Holly Porteus, "Grappling With the BW Genie," *International Defense Review*, March 1995, 33.

[17]Alan Zelicoff, "The Dual-Use Nature of Biotechnology: Some Examples from Medical Therapeutics," Kathleen C. Bailey, ed., *Director's Series on Proliferation*, no. 4 (Livermore, Calif.: Lawrence Livermore National Laboratory, 1994), 83.

[18]U.S. Government Publication, *The Biological and Chemical Warfare Threat* (no date), 31.

While specialized equipment such as artillery shells and cluster bombs can be developed for BTW, these are not the most economical choice for weaponization. Dual-use equipment such as agricultural aerosol generators attached to remotely-controlled drones or possibly cruise missiles – which can themselves be constructed largely from dual-use components – can be used to overcome the technically difficult hurdle of delivery.[19]

Compared to conventional, nuclear, and chemical arms, BTW are inexpensive, relatively easy to produce using dual-use materials and technology, and extremely potent. As with nuclear and chemical weapons, the destructive potential of BTW and the likelihood that they may be employed in conflict has led to international attempts to restrict their spread and use through arms control regimes.

D. ARMS CONTROL DEFINED

J. Christian Kessler defines an *arms control regime* as "a fabric of international legal requirements reflecting and/or establishing accepted norms of national behavior, and mechanisms to implement or operationalize these requirements."[20] The regime is composed of five components. The first element is an *international treaty* committing each state party to forswear acquisition, possession, use, or the threat of use of the subject weapon. Second, an international agreement is necessary to mandate *national controls on trade* in technology relevant to the weapons to be controlled. *Confidence building measures* (CBMs) are a third element. CBMs involve actions that manifest peaceful

[19]Porteus, "Grappling With the BW Genie," 34.

[20] J. Christian Kessler, *Verifying Nonproliferation Treaties: Obligation, Process, and Sovereignty*, (Washington: National Defense University, 1995), 9.

intentions and good faith and seek to decrease each side's threat perceptions, but do not constitute proof of compliance. In contrast, the fourth requirement, *verification*, is a mechanism to confirm that each state party to the agreement is acting in conformity with its obligations and to detect those who violate their obligations. It is expected to provide a high degree of confidence that forsworn behaviors are not being conducted covertly. S*anctions*, the final component of arms control, are means for pressuring regime violators to conform.[21]

Verification only became an important aspect of arms control in the last decade. Applied first in a proposed draft treaty for a comprehensive ban on chemical weapons by Vice President Bush in 1984, on-site inspections of one form or another have been included in every other arms contol negotiation from that point on. Today, verification is considered essential for adequate and effective arms control.[22]

Verification consists of several distinct activities: *collecting* information on activities of each state party; *evaluating* that information to consider whether and to what degree there is evidence which may indicate that the state party is or is not complying with commitments; and making a *judgment* based on the weight of the evidence as to whether the state party is or is not complying with its commitments. Verification seeks to prove a negative, to prove that certain behavior does not exist. Proving the nonexistence of prohibited BTW activity is inherently problematic. One can only demonstrate the failure to detect proscribed behavior, not necessarily that it does not exist.

The BWC contains only the first three arms control elements, and efforts are ongoing to create a verification mechanism combining both non-intrusive and intrusive

[21]Kessler, *Verifying Nonproliferation Treaties*, 13.

measures. *Non-intrusive* measures include declarations of materials, equipment, and facilities which could be of use in conducting the forbidden activity, but which are for related but legitimate activities. *Intrusive procedures* include on-site inspections by international authorities and monitoring of items, areas, and activities.

E. NON-VERIFIABLE ARMS CONTROL

Any arms control effort without provisions for verification of compliance, such as the current BWC, is little more than an easily circumvented declaration of good faith. While most agree that absolute compliance is nearly impossible to ensure, agreements including the Nuclear Non-proliferation Treaty (NPT), and recently the Chemical Weapons Convention (CWC), have enacted verification protocols aimed at increasing the level of certainty with regard to compliance. Parties to the BWC are currently working to produce similar measures, but the nature of BTW and their production make the task much harder than for either nuclear or chemical weapons. The historical record of BTW use and the evolution of the BWC demonstrates the weakness of arms control efforts to date and highlights the need for some way to monitor suspect proliferants such as China.

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[22] Blair L. Murray, "Trust in Tomorrow's World: Verification," in *Arms Control: What Next?*, ed. Lewis A. Dunn, (Boulder, Colo.: Westview Press, 1993), 144.

III. THE CHALLENGE OF BTW ARMS CONTROL

Biological and toxin weapons have been employed in warfare throughout history. Efforts to control their use began early in this century, but proliferation of the means to produce BTW has continued in the face of agreements banning such activity. A changing international security environment and advances in technology in conjunction with the impotence of the Geneva Protocol and Biological and Toxin Weapons Convention have led to a "rediscovery" of BTW in the last decade. Interest in acquiring these weapons is growing among both state and non-state actors. The international community is calling for resolution of discussions over verification measures for the BWC.

A. EARLY BTW WARFARE

The first recorded use of BTW in war can be dated to the 14th century, at Kaffa (now Feodossia, Ukraine) where attacking Tartars catapulted the bodies of comrades who had succumbed to the plague over the walls of the besieged city. An outbreak of plague was followed by the retreat of defending forces, and some medical historians believe that the action spread the disease over the entire continent of Europe, via the Mediterranean ports. Similarly, in the 1710 war between Russia and Sweden, Russian troops used the cadavers of plague victims to start an epidemic within the enemy.[23]

Smallpox was used as a biological weapon against Native Americans during the French and Indian War (1754 - 1763) between France and England, in which both sides relied heavily on the support of Indian allies. The British attacking Fort Carillon were

[23]William C. Patrick III, "A History of Biological and Toxin Warfare," *Director's Series on Proliferation*, no. 4, ed. Kathleen C. Bailey, (Livermore, Calif.: Lawrence Livermore National Laboratory, 1994), 9.

suffering heavy losses and General Sir Jeffrey Amherst decided to take advantage of an outbreak of smallpox at Fort Pitt. Blankets from the Fort Pitt smallpox hospital which were infested with disease-carrying fleas were provided to the Indians loyal to the French, and the resulting epidemic decimated their ranks. Shortly thereafter, General Amherst took Fort Carillon and renamed it Fort Ticonderoga.[24]

Germany developed an ambitious biological warfare program during the First World War, featuring covert operations in neutral countries to infect livestock and contaminate animal feed destined for export to Allied forces. German agents even inoculated horses and cattle with the agents of anthrax and glanders disease in the United States before they were shipped to France. Although horsepower was a major component of wartime logistics, the German use of biological weapons failed to alter the course of the conflict.[25]

B. EARLY EFFORTS AT ARMS CONTROL - THE GENEVA CONVENTION

In response to the horrors of chemical warfare during the First World War, international diplomatic efforts were undertaken to limit the proliferation and use of WMD. The first attempt to restrict biological warfare was the 1925 Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare. This treaty prohibited the use of biological weapons, but did not proscribe research, production, or possession of biological

[24]George W. Christopher et al, "Biological Warfare: A Historical Perspective," *Journal of the American Medical Association*, 6 August 1997, 412.

[25]Patrick, "A History of Biological and Toxin Warfare," 10.

weapons.[26] Many countries ratified the protocol while maintaining a right of retaliation. There were no provisions for inspection to verify compliance with the protocol. Parties to the Geneva Protocol that began research programs to develop biological weapons after the First World War included Belgium, Canada, France, Great Britain, Italy, the Netherlands, Poland, and the Soviet Union. In the interwar period, U.S. military planners disagreed about the usefulness of BTW, and studies conducted by the Army Medical Corps concluded erroneously that BTW would not be an effective warfighting tool because of "modern sanitary procedures."[27]

C. THE JAPANESE PROGRAM IN THE SECOND WORLD WAR

Japan started an ambitious BTW program in 1937 near Harbin, in occupied Manchuria, in a laboratory complex named "Unit 731." The facility consisted of five satellite camps and housed a staff of more than 3000 scientists and technicians. Prisoners were infected with a variety of pathogens including anthrax, meningitis, cholera, and plague, and at least 10,000 prisoners died as a result of experimental infection or execution following experimentation. These studies continued until 1945 when the facility was burned to destroy evidence.[28] Following the war, the United States granted amnesty to scientists who had participated in the program in exchange for information about their experiments. Participants in the program admitted to 12 large-scale field trials of biological weapons. In addition, the water and food supplies of at least 11 Chinese

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[26] U.S. Arms Control and Disarmament Agency, *U.S. Arms Control and Disarmament Agreements, Texts, and Histories of the Negotiations* (Washington, D.C.: U.S. Government Printing Office, 1996), 50.

[27] Ibid.

[28] Christopher, "Biological Warfare: A Historical Perspective," 413.

cities were contaminated with anthrax, cholera, and salmonella. Cultures were tossed directly into homes and sprayed from aircraft.[29]

Unit 731 also developed plague and released as many as 15 million infected fleas from aircraft over Chinese cities. The planes released grain to attract the local rat population, which in turn spread the fleas.[30] From interviews, the Allies learned that research had been conducted in the military application of tularemia, botulism, smallpox, glanders, typhoid and other pathogens. The Japanese, had not, however, adequately prepared, trained, or equipped their own troops for the hazards of biological weapons. A cholera attack on Changteh in 1941 that reportedly resulted in 10,000 Chinese casualties also produced 1,700 deaths among Japanese troops.[31]

D. THE U.S. PROGRAM

The United States began an offensive biological program in 1942 under the direction of the War Reserve Service. The program built a research and development facility at Camp Detrick, Maryland, testing sites in Mississippi and Utah, and a production facility in Terre Haute, Indiana. Experiments were conducted with anthrax and *Brucella suis*, but the production facility failed a contamination test using simulant test bacteria and large scale production was canceled due to safety concerns. However, 5,000 anthrax-filled bombs were produced at a pilot facility at Camp Detrick and tested on Gruinard Island off the coast of Scotland in 1942. The island was heavily contaminated and viable anthrax spores persisted until it was completely defoliated and

[29]Christopher, "Biological Warfare: A Historical Perspective," 413.
[30] Patrick, "A History of Biological and Toxin Warfare," 11.

sprayed with formaldehyde and sea water in 1986.[32] The American program was expanded during the Korean War, after a more modern facility with improved production technology and adequate safety measures was constructed at Pine Bluff, Arkansas. Weapons production began in 1954 in conjunction with a program to develop biological countermeasures to protect troops.[33]

Prior to production, animal tests were performed at Fort Detrick and on barges in the Pacific. Human experimentation was conducted using simulant organisms. In addition, U. S. cities were surreptitiously used to test aerosolization and dispersal methods. In New York City, San Francisco, and other sites between 1949 and 1968, simulants were released in covert experiments. In 1966 U.S. Army researchers released trillions of benign bacteria called *Bacillus subtilis* into the New York midtown subway station during rush hour. Light bulbs, each filled with some 87 trillion bacilli, were tossed onto underground roadbeds or shattered on ventilation grills on the streets above. The findings were alarming. The movement of the trains spread the germs into all but one station of the entire Eighth Avenue and Seventh Avenue lines. The bacilli persisted in the air for an hour, floating not only through stations but also into trains. The army's final report concluded that "a large portion of the working population in downtown New York City would be exposed to disease if one or more pathogenic agents were disseminated covertly in several subway lines at a period of peak traffic."[34] Defending against such as eventuality, the report added, was almost impossible.

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[31]Patrick, "A History of Biological and Toxin Warfare," 11.

[32]James Smith, "Biological Warfare Developments," *Jane's Defense Review*, November 1991, 484.

[33]Christopher, "Biological Warfare: A Historical Perspective," 414.

[34]David E. Kaplan and Andrew Marshall, *The Cult at the End of the World* (New York: Crown, 1996), 235.

In the mid-1960s, the U.S. Army also tested aerosol generators in specially built suitcases to spray simulant bacteria on travelers at National Airport, Washington, D.C. This experiment was considered a success, and the CIA conducted follow-on testing with similar devices.[35] By the late 1960s, the U.S. BTW arsenal included numerous bacterial and fungal plant pathogens and cobra venom, saxitoxin, and other toxins which were developed for the Central Intelligence Agency.[36]

E. THE BIOLOGICAL AND TOXIN WEAPONS CONVENTION

During the late 1960s, the international community raised concerns regarding biological weapons, and the ineffectiveness of the 1925 Geneva Protocol for preventing BTW proliferation. As a result, the 1972 Biological and Toxin Weapons Convention (BWC) was developed. This treaty prohibits the development, possession, and stockpiling of pathogens or toxins in "quantities that have no justification for prophylactic, protective or other peaceful purposes."[37] The BWC also prohibits the development of delivery systems intended to disperse biological agents and requires parties to destroy stocks of biological agents, delivery systems, and equipment within nine months of ratifying the treaty. Transferring biological warfare technology or expertise to other countries is also prohibited. The treaty was ratified in April 1972 and went into effect in March 1975 with more than 100 signatory nations. Of particular note, the BWC included no provisions to insure compliance.[38]

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[35]Kaplan, *The Cult at the End of the World*, 235.
[36]Christopher, "Biological Warfare: A Historical Perspective," 414.
[37]U.S. Government Publication, *The Biological and Chemical Warfare Threat* (no date), 9.
[38]Christopher, "Biological Warfare: A Historical Perspective," 417.

In 1970, President Nixon announced the termination of the U.S. offensive BTW program. While welcomed by many on moral and ethical grounds, his decision was primarily motivated by pragmatic reasons. Given the preponderance of conventional and nuclear weapons available at the time, biological weapons were not considered essential for national security. BTW were seen as untried, unpredictable, and potentially hazardous for users as well as those under attack. In addition, the United States and allied countries had a strategic interest in outlawing BTW programs to prevent the proliferation of such a relatively low-cost WMD. By outlawing biological weapons, decision makers believed that the arms race for WMD could be limited to more expensive and technically challenging nuclear programs.[39]

F. THE REDISCOVERY OF BIOLOGICAL WEAPONS

During much of the Cold War, the United States considered nuclear weapons a way to retaliate against attack by any strategic weapon, including chemical and biological arms. Beginning with the emphasis on nuclear weapons in the doctrine of massive retaliation, issues relating to BTW were downplayed and all but abandoned with the signing of the BWC in 1972. Throughout the 1970s, biological warfare issues received little, if any, attention by military planners and policy makers. [40] While BTW concerns may have taken a back-seat in the West, other countries, including many signatories to the BWC, continued covert BTW development programs.

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[39]Christopher, "Biological Warfare: A Historical Perspective," 416.

[40]David L Huxsoll, "The Nature and Scope of the BW Threat," Kathleen C. Bailey, ed., *Director's Series on Proliferation*, no. 4 (Livermore, Calif.: Lawrence Livermore National Laboratory, 1994), 21.

1. "Yellow Rain" in Southeast Asia

Starting in the mid-1970s, reports emerged from Laos that lethal chemical or toxin weapons delivered by sprays, bombs and rockets were being used against the Hmong resistance by Soviet proxy forces. Subsequently, similar attacks were reported in Kampuchea and Afghanistan. Trichothecene toxins were identified at some of the attack sites, and reported symptoms by survivors were consistent with exposure to agents of this type, which were dubbed "yellow rain."[41]

2. The Soviet/Russian BTW program

Further evidence of continued Soviet BTW research appeared in 1979, when an outbreak of anthrax occurred in Sverdlovsk, a city about 900 miles east of Moscow. A nearby scientific facility was suspected to be conducting biological research, but the Soviets denied that the lab was the source of the infection and blamed the outbreak on contaminated black market meat. Russian President Boris Yeltsin admitted in 1992, however, that the epidemic had been caused by an accidental release of anthrax spores from a military compound where work on BTW was being pursued. The facility's air filters had not been turned on that day. In addition, recently released pathological reports confirm that the cause of death of the Sverdlovsk victims was pulmonary rather than intestinal anthrax. In all, 66 deaths were reported, making this the largest epidemic of anthrax in humans on record.[42]

The Soviets continued their offensive BTW program under the aegis of Biopreparat, a research bureau subordinate to the Ministry of Defense. During the 1970s and 1980s, Biopreparat operated at least six research facilities and five production

facilities and employed up to 55,000 scientists and technicians. The program is now controlled by Russia. While Yeltsin stated in 1992 that he planned to end further offensive BTW research and production, the degree to which the program has been reduced is uncertain. A 1995 report estimated that the Russian program continued to employ 25,000 to 30,000 personnel.[43]

In addition, unconfirmed reports from Russian defectors formerly involved in the BTW program suggest that Moscow was developing new classes of biological weapons, including viral hemorrhagic fevers and genetically engineered bacteria. They specifically mentioned creating a strain of plague that was resistant to multiple antibiotics and engineered to overcome the protection provided by available vaccines. [44]

G. RECENT TECHNICAL ADVANCES

Since the 1980s, several advances in microbiological and pharmaceutical technology have made BTW production easier, cheaper, and more concealable. Huge research and production facilities employing large staffs like Pine Bluff, Unit 731 or Biopreparat are no longer necessary to produce militarily significant BTW. Today any nation with a modest pharmaceutical or fermentation industry could easily and cheaply produce BTW. Mass-production methods for growing bacterial cultures that are widely used in the commercial production of yogurt, yeast, and beer are the same used to make pathogens and toxins.[45] These technical developments have further complicated the

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[41]Huxsoll, "The Nature and Scope of the BW Threat," 23.

[42]Ibid., 22.

[43]Christopher, "Biological Warfare: A Historical Perspective," 416.

[44]Robert P. Kadlec, "Biological Weapons Control: Prospects and Implications for the Future," *Journal of the American Medical Association*, 6 August 1997, 354.

[45]Jonathan Tucker, 24 February 1998 briefing.

already difficult problem of verifying compliance, by increasing the number of potential production sites to be inspected and making it easier for the determined proliferant to conceal clandestine BTW plants.

1. Advances in Bacterial Production

Although biological agents can be grown in ordinary laboratory flasks, efficient production requires specialized fermenters. Until recently, commercial operations producing bacteria relied on tank-type bioreactors holding thousands of liters of culture. Over the past decade, however, the introduction of computer-controlled, "continuous-flow" fermenters has increased productivity, making it possible to reduce the size of a fermenter to about one one-thousandth of the size of a conventional batch fermenter while still maintaining equivalent production. Real-time sensors and feedback loops under microprocessor control optimize culture conditions, producing much higher yields and better quality products than previously possible. Commercial bacteria production now requires fewer trained personnel and uses smaller, more concealable equipment. A developing country or substate actor could produce many small batches of BTW agents in laboratory glassware without the need for high-technology fermenters.[46]

2. Advances in Toxin Production

Bacterial toxins are extracted from microbes produced through fermentation. Botulinal toxin, for example, is derived from a culture of *Clostridium botulinum* bacteria, which multiply rapidly under the proper fermentation conditions of temperature, acidity, and the absence of oxygen. It takes three days to grow a culture of the cells, which then release botulinal toxin into the surrounding medium. Japan's Unit 731 produced

kilogram quantities of botulinal toxin in a fermenter approximately ten feet high and five feet wide. Yields using today's technology could be much higher.[47]

3. Advances in Viral and Rikettsial Agent Production

Pathogenic viruses and rickettsiae are cultivated either in intact living tissue such as chick embryos or mouse brains (which is highly labor-intensive), or in mammal cells growing in a culture of cow or horse blood serum. Until recently, cultured mammalian cells could only be grown on the inner surface of rotating glass bottles, which limited production. Recently-developed "hollow-fiber technology" offers vastly more efficient method of growing anchorage-dependent host cells. The cells attach to the outer surface of thin fibers immersed in growth medium, and air is pumped through the fiber wall to reach the cells. A single commercially available hollow-fiber bioreactor produces the equivalent of several thousand one-liter roller bottles, and only occupies one-twentieth the space of older equipment. [48]

4. Advances in BTW Agent Stabilization

Once BTW agents have been produced, they must be processed into a form that guarantees their survival in storage and delivery. Spore-forming organisms such as anthrax naturally enter a state of suspended animation and can survive for decades in their dormant form. Freeze-drying offers the best method for enhancing the stability of non-spore forming BTW. A lyophilizer, commonly used in the pharmaceutical industry, rapidly freezes a solution of bacteria and then dehydrates it under a constant vacuum to form a dry cake. The dried material can then be milled into a fine dust which could be

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[46]OTA, "Technical Aspects of Biological Weapons Proliferation," 89.
[47]Ibid., 90.

easily inhaled. This technique is also applicable to toxins. If kept in cold storage, lyophilized bacteria and toxins have an effective shelf life of months to years.[49]

Recent agricultural research on biological pesticides, such as the insect-killing bacterium *Bacillus thuringiensis*, has provided information on how to stabilize freeze-dried bacteria in liquid solution form using chemical additives and ultraviolet protectants. Bacterial solutions of this type are compatible with existing agricultural aerosol sprayers.[50]

Another advancement in stabilization technology, known as microencapsulation, emulates natural spore formation by coating droplets of pathogens or toxin with a thin coat of protective gelatin. The polymer coating protects the agent against environmental stresses such as desiccation, sunlight, freezing and the mechanical stresses of dissemination. Once in the lungs, the polymer coating dissolves, releasing the agent. Microencapsulation is routinely used in the production of carbonless carbon paper, where ink droplets are coated in this manner.[51]

5. Improvements in Integration With Delivery Systems

A biological pathogen or toxin is of little military utility unless it can be placed on a target. BTW can be delivered through intermediary organisms such as ticks or fleas, used to contaminate water or food supplies, or spread through the air. Atmospheric dispersal is the preferred method since most BTW agents are easily converted into either dry powder or aerosols, and are most virulent when infection is accomplished through inhalation. Aerosol delivery systems range in complexity and effectiveness from truck-

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[48]OTA, "Technical Aspects of Biological Weapons Proliferation," 89.

[49]Jonathan Tucker, NPS 580 Workshop on Chemical and Biological Weapons, Monterey Institute of International Studies, 14-15 March 1998.

mounted agricultural sprayers to specialized cluster munitions carried on ballistic missiles.

The size of an aerosol particle is critical to both its atmospheric stability and its military effectiveness. Whereas larger particles tend to settle out of the air rapidly, microscopic particles between one and five microns in diameter form an aerosol which remains airborne for a long time. Aerosolized BTW generally do not penetrate the skin and do not represent a significant contact hazard; instead, they infect only if inhaled into the lungs. Particle size is also critical for respiratory infection. Almost all particles larger than five microns in diameter are trapped in the phlegm and passages of the upper respiratory tract, while particles smaller than one micron in diameter are exhaled without being absorbed by lung tissue. Only particles between one and four microns are small enough to reach the alveoli, bypassing the body's natural filtering and defense mechanisms.[52]

H. RENEWED INTEREST IN BTW

Technological developments and the spread of expertise have brought the acquisition of potentially devastating BTW within the reach of over 100 nations. The impotence of any control regime to stem BTW proliferation is evident: there are nearly twice as many BTW equipped states today as there were in 1972 when the BWC was ratified.[53] These factors, combined with the relative successes of nuclear and chemical arms control have made BTW an increasingly attractive option for both state and substate

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[50]OTA, "Technical Aspects of Biological Weapons Proliferation," 94.
[51]Tucker, 14-15 March workshop.
[52]OTA, "Technical Aspects of Biological Weapons Proliferation," 96.

actors. Several recent examples demonstrate that despite efforts to stem the development and use of BTW, interest is acquiring BTW programs is growing.

1. The Iraqi BTW Program

The case of Iraq, a signatory to the BWC, demonstrates the ease in which a nation with modest means can clandestinely develop a robust BTW program. After initial work in the late 1970s, Iraq's biological warfare program started in earnest in 1985. By the end of Operation Desert Storm in April 1991, Iraqi scientists had studied the BTW potential of bacteria, viruses, toxins, and a crop destroying fungus.

In 1987, production of anthrax cultured from samples obtained from France and the United States began at Salman Pak and Al Hakam Single Cell Protein Production Plant. Eventually 8,000 liters of concentrated anthrax solution was produced and three-quarters of this solution was weaponized. *Clostridium perfringrens* (the cause of gas gangrene) was also studied at Al Hakam, but the Iraqis claim it was never weaponized.[54]

One crop-destroying fungal strain, wheat cover smut, was evaluated for weapons use in 1985 at Salman Pak. Smut spores were field tested against wheat plants and proved lethal to the crop. This implies that Iraqi leaders may have had plans to use BTW for economic warfare.

Beginning in 1990, researchers at the Foot and Mouth Disease Center at Al Manal investigated five viruses for their potential utility as incapacitating weapons. Three of the agents, enterovirus 17, human rotavirus, and camel pox, were mass produced before the

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[53]Kadlec, "Biological Weapons Control: Prospects and Implications for the Future," 351.

[54]Raymond A. Zilinskas, "Iraq's Biological Weapons: The Past as Future?" *Journal of the American Medical Association*, 6 August 1997, 418.

plan was abandoned later in the year. Camel pox may have been considered an "ethnic weapon" since individuals raised in the presence of camels develop natural immunity.[55]

Substantial attention was also given to weaponizing aflatoxin, botulinum toxin, ricin, and tricothecenes. Iraq adapted 250- and 400-pound bombs and 122-mm rockets to carry BTW. Most significantly, 25 Al Hussein ballistic missiles were fitted with biological warheads. Of these, 13 carried botulinum, 10 were filled with aflatoxin, and 2 with anthrax. All reportedly were deployed in railway tunnels and bunkers along the Tigris River.[56]

In addition, the Iraqis possessed several hundred modern Italian-made pesticide dispersal systems that were fitted with sprayer nozzles capable of generating aerosols of the one to five micrometer range, which is optimal for BTW. Some sprayers and appropriate holding tanks were installed on aircraft and land vehicles. In 1990, the Iraqis also modified a MIG-21 fighter plane to function as a remotely piloted vehicle (RPV) and equipped it with a 2200 liter belly tank and spray mechanism. In a field test carried out in January 1991, the RPV sprayed a biological simulant solution over a practice target range, but the exact results of this experiment are unknown.[57]

Soon after Iraq had accepted a cease-fire under United Nations Security Council Resolution 687 in April 1991, BTW program personnel reportedly were ordered to destroy all biological agents and munitions containing BTW. Stockpiles of agent were reportedly treated with formaldehyde and dumped onto bare ground near the Al Hakam perimeter. Iraqi personnel supposedly incinerated munitions in pits, destroyed them with conventional munitions, and tossed some into the Tigris River. Although some whole

[55]Zilinskas, "Iraq's Biological Weapons: The Past as Future?" 419.
[56]OTA, "Technical Aspects of Biological Weapons Proliferation," 72.

and fragmented munitions have been recovered, no conclusive evidence exists that BTW stores or munitions were all destroyed. The Iraqis destroyed the Salman Pak facility several days before the arrival of the first UNSCOM inspection team in 1991. The Al Hakam plant and the Al Manal facility were destroyed under UNSCOM direction two years later.[58]

The experience of UNSCOM in Iraq has highlighted the necessity of intrusive inspection measures to ensure weapons control agreement compliance. Iraq hid from UNSCOM inspectors information concerning their BTW program for four years after the Gulf War. Despite comprehensive mandatory declarations, numerous challenge inspections to 80 biocapable facilities, including breweries, food production plants, pharmaceutical plants, and medical laboratories, UNSCOM found "no incriminating evidence that would identify any of the sites as linked to a proscribed biological weapons program."[59] Only after the defection of the late Lieutenant General Hussein Kamel Hassan, would the program suspected by intelligence officials be proven. The U.S. intelligence community estimates that Iraq could reconstitute its biological weapons program in a matter of weeks once sanctions are removed.[60]

2. The Rajneesh Cult

In 1981, followers of Indian guru Bhagwan Shree Rajneesh purchased a large ranch in Wasco County, Oregon, to build a new international headquarters for the sect. Construction of the commune was controversial. Cultural values and land-use issues were the major areas of conflict. Part of the ranch was incorporated as the city of

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[57]Zilinskas, "Iraq's Biological Weapons: The Past as Future?" 420.
[58]Ibid.
[59]Kadlec, "Biological Weapons Control: Prospects and Implications for the Future," 354.

"Rajneeshpuram," but the charter was challenged in the courts, limiting new construction. Commune members believed that the outcome of the 6 November 1984 elections for Wasco County commissioners would have an important impact on further land use decisions. They sought to influence the vote.[61]

Cult members with a knowledge of microbiology working in clandestine laboratories in the Rajneeshpuram medical center, produced cultures of *Salmonella Typhimurium,* and contaminated salad bars and coffee cream in at least ten local restaurants. Their objective was to limit voter turnout and skew the upcoming election in their favor, and this operation was to be a test of the capability. A total of 751 people were incapacitated to some degree with *Salmonella* gastroenteritis following the attacks. In addition, plans were made to contaminate the county water supply. Despite extensive investigation by national and local agencies, the source of poisoning went unrecognized until evidence was discovered in an unrelated criminal investigation more than a year later. Clinic records seized indicated that the laboratory had obtained the *Salmonella* culture legally through a Rockville, Maryland biological supplies company.[62]

3. Aum Shinrikyo

Although achieving notoriety after their 1995 attack on a Tokyo subway using the chemical nerve agent sarin, the apocalyptic Japanese cult Aum Shinrikyo also developed an ambitious biological weapons program. The program was directed by Seiichi Endo, a 28-year old former genetic engineer from Kyoto University's Viral Research Center.

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[60]Kadlec, "Biological Weapons Control: Prospects and Implications for the Future," 354.

[61]Thomas J. Torok, "A Large Community Outbreak of Salmonellosis Caused by Intentional Contamination of Restaurant Salad Bars," *Journal of the American Medical Association*, 6 August 1997, 388.

[62]Torok, "Salmonellosis Caused by Intentional Contamination of Restaurant Salad Bars," 389.

Without arousing the suspicions of Japanese police or import control officials, Endo and his group were able to obtain the equipment and materials to produce a range of BTW.

In early 1990, Aum began production of botulinum toxin in a biocontainment laboratory within their headquarters compound near Mount Fuji. Concurrent with toxin production, Aum's scientists also developed antitoxin using horse serum at a second biolab near Mount Aso which included a stable for donor animals.[63] Aum's early attempts to produce botulinal toxin were plagued by quality control problems, probably the contamination of the anaerobic culture vessels by oxygen. As a result, the first two attempted attacks using the toxin were unsuccessful. In the first, in April of 1990, three trucks configured with aerosol spray devices disguised as exhaust pipes were driven repeatedly through the area surrounding the Japanese parliamental building where a full session of the Diet was meeting.[64] The convoy then drove south to attack the American naval installations at Yokohama and Yokosuka. This marked the first time that BTW had been used by terrorists against the U.S. Government.[65] Aum attempted a second unsuccessful "drive-by" botulinum attack in June, 1993, against the wedding of Crown Prince Naruhito and Masako Owada.[66]

Also in June 1993 a new biolab was completed in an eight-story building in eastern Tokyo. In this facility, Aum technicians cultured anthrax bacteria and attempted to disperse a solution of spores using a steam generator and powerful fan mounted on the roof of the building. Luckily, the group again was thwarted by manufacturing problems, and the attack produced only minor sickness and nausea in the immediate population.

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[63]Kaplan, *The Cult at the End of the World*, 53.

[64]Ibid., 58.

[65] William J. Broad, "How Japan Germ Terror Alerted World," *The New York Times*, 26 May 1998, A1.

Experts have speculated that the process of incubating the bacteria into their spore form was likely unsuccessful, sparing metropolitan Tokyo a potentially devastating epidemic.[67]

Other pathogens were also investigated by Aum's biotechnicians. In 1992, during the height of the Ebola virus epidemic in Zaire, Aum "missionaries" were dispatched on an "African Salvation Tour" to attempt to collect cultures of the pathogen. Three hospitals that treated Ebola victims were visited and it is possible that the "missionaries" might have obtained viable cultures of the virus. Endo also cultured North Queensland fever, a highly contagious rickettsia that causes extreme flu-like conditions for up to three months. [68]

Aum also began a genetic engineering program to modify the molecular characteristics of biological agents to make them easier to handle, cheaper to produce, harder to detect, and nearly impossible to cure. These techniques rely heavily on cutting-edge computer-controlled equipment that is produced primarily in the United States. Working through an Aum front company in New York, Endo was able in 1995 to purchase advanced molecular design software from companies in Oregon and St. Louis, and Silicon Graphics workstations and other hardware from Biosym Technologies in San Diego.[69] Additionally, Aum computer experts, working through the Internet, downloaded the entire Protein Data Bank from the Brookhaven National Laboratory in New York. The database is a repository of information on more than 3,000 proteins,

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[66]Kaplan, *The Cult at the End of the World*, 94.
[67]Ibid., 69.
[68]Murray Sayle, "Nerve Gas and the Four Noble Truths," *The New Yorker*, 1 April 1996, 67.
[69]Kaplan, *The Cult at the End of the World* , 232.

nucleic acids, and other organic molecules, including the chemical breakdowns of various toxins.[70]

Aum was developing several avenues for BTW dispersal. In addition to the ineffective automobile sprayers, front companies purchased a Russian Mi-17 HIP helicopter, a blimp, and two drone helicopters capable of carrying 18 pound payloads. According to the manufacturer of the drones, which were designed for film production, the Aum buyers spoke of plans to convert them to "remote-controlled crop dusters." Two members were sent to private flight school in Opa Locka, Florida. [71]

Using the studies prepared by the U.S. Army and CIA in the 1960s as a framework, Aum constructed a number of prototype BTW dispensers fitted into briefcases. The bacteria were held in solution in vinyl tubes, which were mounted on small ceramic diaphragms. Powered by batteries, the device turned the solution into steam, which was then blown from the briefcase by a small electric fan. The system was triggered by ultrasonic vibrations, so that a passing train would activate the mechanism and release a spray of botulinum toxin, which by this time had been perfected.

On March 15, 1995, an Aum member placed briefcases at three ticket gates near the Kasumigaseki Station of the Tokyo subway line and departed. All three cases were found and picked up by station-masters as lost property. Two of the cases malfunctioned, but one activated and dispersed a steam cloud as designed. Luckily, the Aum member who placed the devices had suffered a guilty conscience and removed the toxin prior to leaving them.[72]

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[70]Sayle, "Nerve Gas and the Four Noble Truths," 66.
[71]Ibid., 67.
[72]Kaplan, *The Cult at the End of the World*, 236.

I. EXPLAINING THE REDISCOVERY OF BTW

Several explanations for the rediscovery of BTW have been suggested. Billy Richardson and John P. Carrico blame uncertainties resulting from the disintegration of the Soviet Union. They argue that in the past, the U.S. military served as a deterrent to the use of chemical or biological weapons in regional conflicts. The ongoing post-Cold War drawdown of U.S. military capabilities, however, has reduced the credibility of global preventative measures and nuclear deterrence. In the context of these changes, they believe that the likelihood of a potential BTW user to doubt U.S. intervention is greater. In their view, this trend heightens the possibility that regional biological warfare will occur.[73]

Others, including Graham Pearson, former director of Britain's chemical and biological defense program, believe that the successes of the international community in controlling the spread of other forms of WMD have made BTW more attractive to aspiring proliferants.[74] The effectiveness of the Nuclear Non-proliferation Treaty (NPT) and the recently ratified verification regime for the Chemical Weapons Convention (CWC) will make future acquisition of these weapons increasingly difficult for future groups and developing nations. This factor, in combination with the impotence of the BWC, makes BTW even cheaper and easier to acquire in relative terms.

A third argument, made by Richard Danzig, David Huxsoll, and others is that technological advances of the past decade, and the growing availability of relevant

[73]Billy Richardson and John P. Carrico, "The Challenge of Biological Warfare Defense," ed. Kathleen C. Bailey, *Director's Series on Proliferation,* no. 4 (Livermore, Calif.: Lawrence Livermore National Laboratory, 1994), 34.

technical training and information, make the acquisition of BTW by aspiring states or other entities more likely. Since the expertise and materials necessary to produce BTW are dual-use, advancements in genetics, pharmaceutical, and vaccine research could be easily applied toward offensive weapons programs.[75]

The rediscovery of BTW is most likely due to a combination of these three factors. A less predictable international security environment along with technical developments that make production easier and more concealable, and the lack of effective measures to detect clandestine programs, have brought the issue of BTW proliferation from obscurity into high level policy discussions.

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[74] Graham S. Pearson, "Biological Weapons: A Priority Concern," ed. Kathleen C. Bailey, *Director's Series on Proliferation*, no. 3 (Livermore, Calif.: Lawrence Livermore National Laboratory, 1994), 41.

[75]Huxsoll, "The Nature and Scope of the BW Threat," 21.

IV. STRENGTHENING THE BIOLOGICAL AND TOXIN WEAPONS CONVENTION

To strengthen the BWC, signatories have met in a series of discussions to identify confidence-building measures and most recently, verification procedures to increase transparency and encourage compliance. Using the CWC verification protocol as a framework, negotiators in the Ad Hoc Group of Governmental Experts are working to overcome differences arising from concerns that intrusive inspections will compromise military and industrial security. The PRC has been an active participant in the BWC review process and claims to have never possessed biological weapons. U.S. intelligence agencies suspect, however, that the PRC is in violation of the BWC, and policy makers should consider how American participation in the verification protocol could affect the BWC and BTW policy of suspected proliferants such as China.

A. REVIEW CONFERENCES

A series of Review Conferences have been convened in 1981, 1986, 1991, and 1996 to improve operations of the BWC. States Parties at the First and Second Review Conferences agreed to the following seven confidence-building measures (CBMs):

1. Information exchange concerning laboratories with the highest safety level (BL4) or which specialize in research into defensive measures against the hostile use of microorganisms and toxins;

2. Information exchange concerning unusual outbreaks of disease or poisoning;

3. Information exchange concerning research publications with direct relevance to the Convention;

4. Support for contacts between researchers active in the area of protective and prophylactic measures against biological agents;

5. Declaration of legislation, regulations, and other measures;

6. Declaration of past activities in offensive and/or defensive biological research since 1 January 1946.

7. Declaration of human vaccine production facilities.[76]

These measures were designed to improve transparency through pledges and provision of data on national programs. As CBMs, they were and remain voluntary with no provision for verification.

B. VEREX CONFERENCES

At the Third Review Conference, delegates decided that CBMs alone had been ineffective in controlling proliferation and proposed crafting a *verification regime* to help detect or discourage clandestine BTW production. The Conference then established a group of government experts to identify technical verification measures. This group, called "VEREX" (for "Verification Experts") met four times between 1992 and 1993 and identified a list of possible verification measures in seven categories. Off-site measures included information monitoring, data exchange, and remote sensing. Measures in the on-site categories included:

- Exchange visits
- Interviewing of facility personnel
- Visual inspection
- Identification of key equipment
- Auditing of facility records

[76]Oliver Thranert, "Strengthening the Biological Weapons Convention: An Urgent Task," *Contemporary Security Policy*, December 1996, 352.

- Sampling and identification
- Medical examination of facility personnel
- Continuous monitoring by instruments
- Continuous monitoring by personnel

In its final report presented in 1994, VEREX concluded that while no single measure alone could confirm compliance or noncompliance, combinations of measures might increase the probability of observing the behavior of a suspected violator.[77]

C. AD HOC GROUP DISCUSSIONS

The Convention established an Ad Hoc Group (AHG) in 1995 to draft proposals for a legally binding protocol incorporating these verification measures. The AHG has met five times since 1995, and in its most recent meeting in September 1997, produced a "rolling text" proposal. Multilateral negotiations are ongoing as to what combination of verification measures will be accepted.

1. The CWC as a Framework for Verification

The protocol measures under negotiation have been modeled after those of the Chemical Weapons Convention and fall into three primary categories. *Declarations and annual reports* state BTW capable, facilities, and imports and exports of scheduled materials and equipment. *Routine inspections* are conducted at declared government and private commercial facilities. These are intrusive and given on short notice, with multinational inspection teams arriving within 48 hours. *Challenge inspections* may be given at any time at any facility, declared or otherwise. Inspection is also short notice,

and conducted within 120 hours of request by a suspecting party. Challenge inspections are subject to a "red light filter." Once requested by a suspecting state party, a challenge inspection will be conducted unless countered by a three-quarters majority vote of member states.[78]

Since ratification in April 1997 the Technical Secretariat of the CWC has conducted 134 routine inspections in 21 countries.[79] To date, however, the U.S. Congress has yet to pass legislation needed to implement fully the conditions of the Convention. Without the CWC implementing legislation, the U.S. government does not have the legal basis to require American chemical companies to comply and is therefore in technical violation of the treaty.[80]

Whatever BWC monitoring measures are agreed to will be equally binding between all participating states. Operating under a kind of "golden rule" for treaty negotiations, members of the Ad Hoc Group must be prepared to accept the same types of intrusive monitoring they wish to apply to others. Each nation must therefore find the right balance between a regime that is intrusive enough to ensure that other countries are following the rules and one that allows them to safeguard sensitive industrial and national-security information.[81]

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[77]Edward Lacey, "Tackling the Biological Weapons Threat: The Next Proliferation Challenge," *The Washington Quarterly*, April 1994, 53.

[78]Jonathan Tucker, NPS 580 Workshop on Chemical and Biological Weapons, Monterey Institute of International Studies, 14-15 March 1998.

[79]Ibid.

[80]Jonathan Tucker, "Congress has undermined global chemical weapons ban," *The Monterey County Herald*, 15 March 1998, A13.

[81]Tucker, "Putting Teeth" 39.

2. Verification techniques

Three analytical methods are employed in inspections to identify disease-causing bacteria and viruses. In *bioassay*, scientists cultivate a collected sample and identify the grown microbes using chemical or physiological tests. *Immunoassay* employs specific antibodies to detect unique molecular markers on the surface of target microorganisms and protein toxins. *Genetic analysis* uses "gene probes" – short strands of synthetic DNA - that bind to complementary DNA sequences unique to each microbial species. Gene probes are often employed in conjunction with a technique called the polymerase chain reaction (PCR), which multiplies a given DNA sequence more than a million fold. With the aid of PCR, scientists can quickly identify a species of bacteria even if only a few dozen cells are present in the sample – avoiding the need to culture them into large colonies over a period of days or weeks.[82]

These analytical techniques occasionally produce "false positives" when a genetic marker appears in both a pathogenic agent and a harmless microorganism. For positive confirmation, multiple techniques would then be used. False positives can also be generated by the detection of small quantities of naturally occurring pathogen (anthrax occurs naturally in soil) that may be tracked into production facilities.[83]

3. Debate Within the United States

While some U.S. authorities may support on-site inspections, the multi-billion dollar U.S. pharmaceutical and biotechnology industries fear intrusive verification will open their facilities to industrial espionage and loss of proprietary information. This is a legitimate concern and industrial groups such as Pharmaceutical Research and

Manufacturers of America (PhRMA) strongly oppose on-site verification measures and lobby to promote their interest in limiting intrusive inspections.[84] The stakes are high for a number of reasons:

- The cost of bringing a pharmaceutical product to market runs between $350 and $500 million.[85]
- According to the PHRMA, pharmaceutical manufacturers spend 19.4 percent of sales on R&D, compared to an average across all industries of 3.8 percent.
- U.S. drug companies lead the world in innovation, accounting for 36 percent of global pharmaceutical research and development.[86]
- The cost of suspending production operations for inspections has been estimated to cost approximately $400,000 per day.[87]

Biotechnology-based medicines represent a major growth sector for the U.S. pharmaceutical industry. In 1995, U.S. firms and organization were responsible for about 80 percent of patents for genetically engineered health-care and pharmaceutical products issued by the U.S. Patent Office. From 1989 to 1996, the number of biopharmaceuticals being developed by U.S. companies to treat diseases ranging from the common cold to cancer soared from 80 to 284. Over the same period, the number of U.S. companies developing new-generation biotechnology drugs more than doubled, from 45 to 113.[88]

The pharmaceutical industry is keenly competitive, and industrial espionage is a concern for companies. The organisms, most processes, and equipment are not patented,

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[82]Tucker, "Putting Teeth," 39.

[83]Ibid.

[84]PhRMA's position on the BWC is explained on their webpage, available from http://38.251.190.2, Internet.

[85]Al Holmberg, "Industry Concerns Regarding Disclosure of Proprietary information," *The Director's Series on Proliferation*, (Livermore, Calif.: Lawrence Livermore National Laboratory, May 1994), 93.

[86]Tucker, "Putting Teeth," 41.

[87]Kathleen C. Bailey, "Responding to the Threat of Biological Weapons" Lawrence Livermore National Laboratory's *Security Dialogue*, Vol. 26(4), 1995, 389.

primarily as a measure to keep them secret. Thus, there is much vulnerability to industrial espionage. U.S. pharmaceutical companies exercise careful control over who is allowed to enter production facilities, and stringent external security at drug research laboratories.[89]

Biotechnology and pharmaceutical companies fear that foreign inspectors visiting their plants could gain insight into their production techniques or even obtain a covert sample of a genetically engineered microorganism, whose proprietary DNA sequences could then be copied. Such information is worth vast sums. The genetically engineered bacterium that produces human insulin, for example, is valued at more than $1 billion, according to its developer, Lilly Research Laboratories, in Indianapolis.[90]

The nature of the measures proposed in the Ad Hoc Group does pose a potential risk of compromising proprietary secrets to both domestic competitors and foreign nationals present in the inspection teams. In fact, many foreign governmental entities, including the PRC Ministry of State Security, target foreign high technology and frequently use academics and scientists traveling abroad as intelligence collectors.[91] Experts of the caliber participating in BWC sponsored inspection teams would be ideally placed to steal technical secrets.

The pharmaceutical industry also worries that anthrax spores or other pathogens naturally present in the environment may be tracked into a vaccine plant on workers shoes and be detected by international inspectors – raising suspicion of a BWC violation and damaging the firm's reputation. "The release of erroneous information implying

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[88]Tucker, "Putting Teeth," 42.
[89]Kathleen C. Bailey, "Responding to the Threat," 388.
[90]Tucker, "Putting Teeth," 42.

serious wrongdoing could cause irreparable harm to a company's relationship with its shareholders and the general public," observes William Muth, a scientist at Lilly.[92]

Most pharmaceutical industry representatives endorse the concept of "managed access," an approach developed for on-site inspections under the Chemical Weapons Convention. In this procedure, the inspection team and the host country negotiate the amount of access to be provided to sensitive areas of the inspected site. For example, facility managers might turn off computers, lock up documents, place cloth shrouds over items of production equipment considered proprietary, and specify where and when samples may be taken. In return for such limits on access, the inspected party must make "every reasonable effort" to provide alternative means of addressing the inspectors' compliance concerns. Some arms-control analysts doubt that managed access will be effective in catching BWC violators because it assumes a large degree of good faith and cooperation on the part of the inspected party.[93]

4. Debate within the Ad Hoc Group

Following the publication of the VEREX recommendations in 1994, debate over the nature of a BWC verification protocol was sharply divided among members of the Convention. The United States and Japan favored elaboration of some form of transparency regime with enhanced compulsory CBMs but not a full-blown verification regime. Most European states and Canada, New Zealand and Australia advocated negotiation of a verification protocol that would include mandatory on-site inspection. The "nonaligned" or "developing group" of states led by Russia and India supported

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[91]Nicholas Eftimiades, "China's Ministry of State Security: Coming of Age in the International Arena," *Occasional Papers in Contemporary Asian Studies* (College Park, Maryland: School of Law, University of Maryland, 1992), 16.

enhanced verification in principle, but expressed wariness in establishing a costly and intrusive inspection regime. The People's Republic of China stood with the nonaligned states in this regard, but was more vocal in its opposition to on-site inspection measures.[94]

Current debate within the Ad Hoc Group remains split. The "Western Group," led by the European Community continues to favor a program allowing on-site inspections. The "non-aligned group of nations" (NAG) led by Russia, China, and India advocate a non-intrusive regime.[95] The United States and Japan have been criticized recently for a perceived lack of leadership in the negotiation process.[96] The deadline for presenting a protocol for final acceptance, originally set for 1998, has been pushed back to the end of 2001.[97]

D. CHINESE PARTICIPATION IN THE REVIEW PROCESS

The People's Republic of China refused to join the initial BWC in 1972 due to what it perceived as a double standard imposed by the Convention upon the developing world. The Chinese characterize the early years of arms control primarily as an effort by the United States and the Soviet Union to prevent other nations from obtaining advanced military technology.[98] Ambassador for Disarmament Affairs Sha Zukang called the original convention a "fraud of sham disarmament" concocted by the two superpowers

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[92]Tucker, "Putting Teeth," 40.

[93]Ibid, 43.

[94]Edward J. Lacey, "Tackling the Biological Weapons Threat: The Next Proliferation Challenge," *The Washington Quarterly*, Autumn 1994.

[95]Stephanie Nebchay, "Biological weapons talks hit snags in final days," *Reuters World Service*, 5 December 1996.

[96] Marie Chevrier, "Progress and Peril in the Ad Hoc Group to Strengthen the BWC," available http://csf.colorado.edu/dfax/dd/dd07.htm#T-0018, Internet.

[97]Tucker, 14-15 March workshop.

[98]Monte Bullard and James Lamson, "China: Security and Arms Control" (Monterey Calif.: Monterey Institute of International Studies, 1997), 5.

under the pretext of preventing proliferation to block legitimate economic and technological exchanges of other nations.[99]

China acceded conditionally to the BWC in 1984. It considers the Convention to be legally binding only with other signatory parties, and non-binding in regard to any enemy states whose armed forces or allies violate the Convention's provisions. Despite this stipulation, it denies having a BTW program and has been an active participant in the Review Conferences since joining in 1984. Official PRC statements enthusiastically endorse strengthening the BWC but negotiators in the Ad Hoc Group have opposed intrusive inspection measures and legally binding disclosures of past activity as part of a verification protocol.

E. THE PROBLEM: SUSPICION OF PRC VIOLATIONS

The PRC denies ever having developed biological weapons: "Having been caused great harm by biological weapons, China has all along stood for the complete prohibition and thorough destruction of biological weapons, and has never developed, produced, stockpiled or otherwise acquired or retained biological agents, toxins, or weapons equipment or means of delivery for them." [100] Despite these claims, U.S. intelligence organizations strongly suspect that China is in violation of the BWC. In his unclassified 25 November 1997 brief *Proliferation: Threat and Response*, Secretary of Defense Cohen stated that China possesses an advanced biotechnology infrastructure and the biocontainment facilities necessary to perform research and development on lethal

[99]"Official tells U.N. to stop double standard of some weapons agreements," *Xinhua News Agency*, 14 October 1997.

pathogens.[101] In its annual report, *Adherence to and Compliance with Arms Control Agreements*, the U.S. Arms Control and Disarmament Agency also stated:

> The United States believes that China had an offensive BW program prior to 1984 when it became a Party to the BWC. The United States believes that based on available evidence, China maintained an offensive BW program throughout most of the 1980s. The offensive BW program included the development, production, stockpiling or other acquisition or maintenance of biological warfare agents. China's CBM-mandated declarations have not resolved U.S. concerns about this program and there are strong indications that China probably maintains its offensive program. The United States, therefore, believes that in the years after its accession to the BWC, China was not in compliance with its BWC obligations and that it is highly probable that it remains noncompliant with these obligations.[102]

The Chinese adamantly deny the U.S. intelligence community's assessment, dismissing it as unfounded.

China has the distinction of being one of the few nations ever subjected to BTW. As a member of the BWC since 1984, Chinese delegations have played an important role in the process of strengthening the Convention and in discussions over verification. Most importantly, the PRC is believed to maintain a mature BTW production capability, stockpiles of BTW weapons, and is suspected of transferring technology and information relevant to their production. The contradiction between the Chinese official position on BTW and their suspected active BTW program poses a challenge for U.S. policy makers. It is in the best interests of the United States and its East Asian allies that the PRC comply with the BWC and assist in controlling BTW proliferation in the region.

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[100]"The Biological Weapons Convention," Monterey Institute of International Studies Nonproliferation Center, available from http://www.cns.miis.edu/db/china/bwcorg.htm, Internet, 10 October 1997.

[101]William Cohen, "Proliferation: Threat and Response," available from http://www.defenselink.mil/pubs/prolif97/index.html, Internet.

[102] Arms Control and Disarmament Agency, *Adherence To and Compliance With Arms Control Agreements* (Washington, D.C.: ACDA, 7 August 1996.)

V. BWC INSPECTION AND THE PEOPLE'S REPUBLIC OF CHINA

Debate continues within the United States over whether the BWC inspection protocol under consideration in the Ad Hoc Group should be accepted. With the deadline for finalization pushed back to 2001, American approval is uncertain. [103] How might U.S. acceptance, or rejection of a BWC inspection protocol affect Chinese participation in the regime?

To answer this question, this chapter identifies the institutions involved in the formation of Chinese BTW arms control policy, their objectives, past positions on commensurate issues, and relative influence. While information on Chinese foreign policy formation is fragmentary, Michael Swaine's work provides a useful analytic framework. The Swaine model of Chinese bureaucratic decision making states that institutional subarenas formulate different aspects of foreign policy. Nonproliferation policy is one area that overlaps the defense, foreign policy, and intelligence subarenas, requiring these groups to reach consensus. Past behavior of these subarenas shows that each considers different aspects of the external environment when calculating the costs and benefits of a particular policy.

Ongoing negotiations in the BWC and its pending inspection protocol bring interests of the defense policy, foreign policy, and strategic research, analysis and intelligence subarenas into conflict. China has shown a reluctance to accept intrusive inspections in the past, suggesting the primacy of defense over economic and political concerns. U.S. participation in the inspection protocol, however, alters the constraints and

[103]Tucker, 14-15 March 1998 workshop.

pressures exerted on PRC bureaucratic entities, and may affect a change in Chinese BWC and BTW policy.

A. SWAINE'S MODEL

Swaine identifies the leaders and processes governing the formation of Chinese national security policy. According to his model, the PRC national security policy "arena" is composed of four distinct, but closely related institutional "subarenas," each responsible for its own set of policy functions. The *National Strategic Objectives (NSO) subarena* focuses on broad principles and goals guiding the entire national security policy arena. The *Foreign Policy (FP) subarena* centers on civilian foreign affairs and diplomatic relations. *The Defense Policy (DP) subarena* includes defense and security related activities. Finally, the *Strategic Research, Analysis, and Intelligence (SRAI) subarena* supports leaders of the other three subarenas with analysis and intelligence assessments.

Unlike the United States and Russia, which have a long history of participation in arms control regimes, China lacks a single government agency (comparable to the ACDA in the United States) with a mandate to specialize in these issues. A number of organizations within the PRC bureaucracy play a role in formulating the Chinese position on nonproliferation.[104] BWC and BTW policy formation therefore involves the interplay of these subarenas and the personalities who head them. Linkages and influence between the four subarenas vary considerably. Vertical connections between the NSO subarena and both FP and DP organizations are relatively strong, while lateral linkages

between defense and foreign policy elements are weak and informal.[105] Subarenas, elements involved in BWC policy, and relationships are represented in Figure 2.

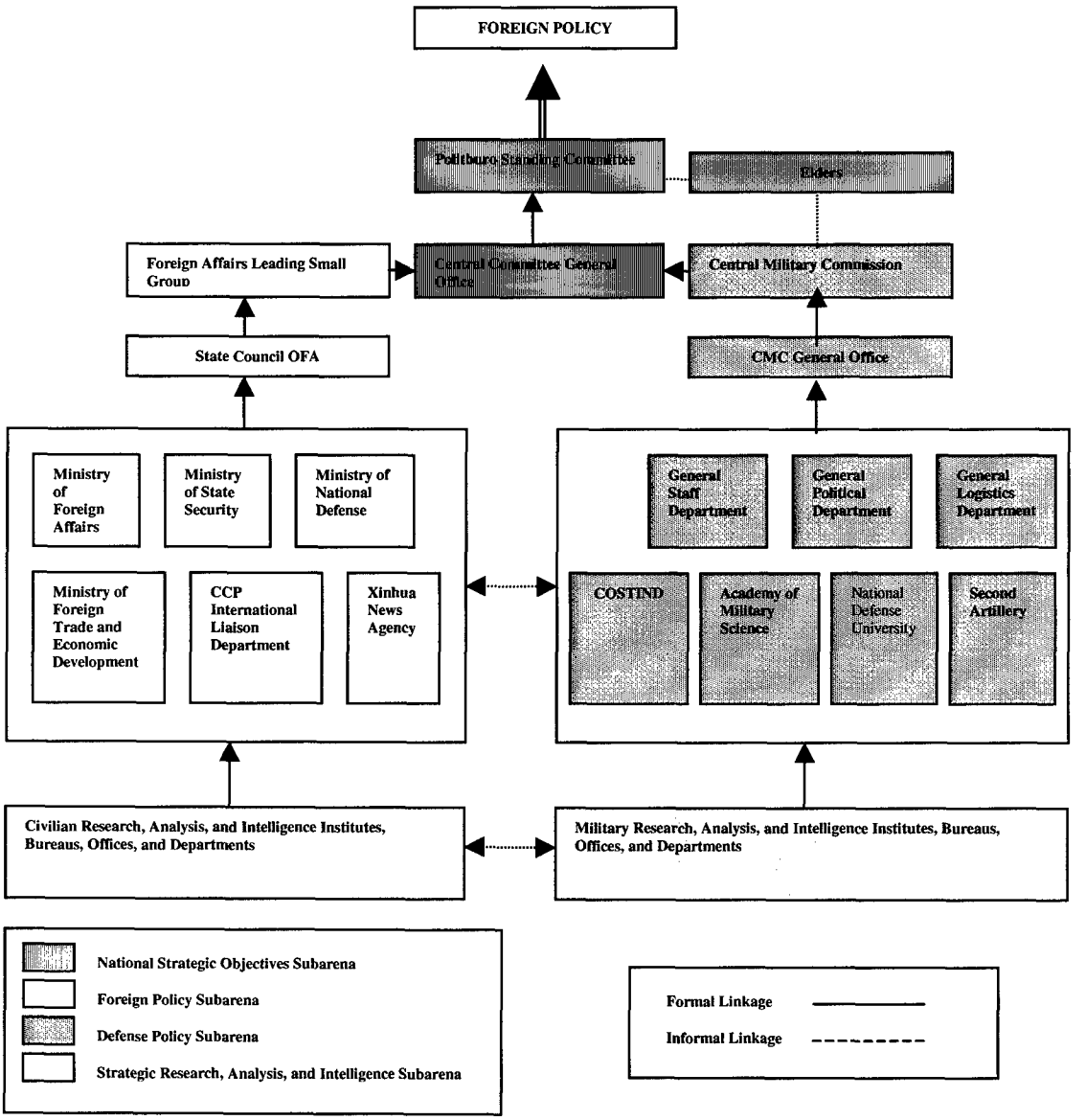

Figure 2. China's National Security Policy Arena

Source: Michael D. Swaine, *The Role of the Chinese Military in National Security Policymaking* (Santa Monica, Calif.: RAND, 1996), 3.

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[104] Wendy Frieman, "New Members of the Club: Chinese Participation in Arms Control Regimes 1980-1995," *The Nonproliferation Review*, Spring-Summer 1996, 15.

[105] Michael D. Swaine, *The Role of the Chinese Military in National Security Policymaking* (Santa Monica, Calif.: RAND, 1996), 74.

B. THE NATIONAL STRATEGIC OBJECTIVES SUBARENA

The National Strategic Objectives Subarena is composed of senior party, state, and military leaders. Ultimate authority rests with an informal collective leadership of four individuals: Jiang Zemin (as party general secretary and head of the Central Military Commission); Premier Zhu Ronghi (responsible for state affairs and head of the foreign policy system); and two powerful People's Liberation Army (PLA) elders, Admiral Liu Huaqing and General Zhang Zhen. They are supported by the Politburo Standing Committee (PBSC) and the most influential retired and semi-retired cadres of the revolutionary generation. These individuals determine China's national strategic objectives, and have authority over foreign policy including arms control agreements.[106]

1. Chinese National Strategic Objectives

Since the late 1970s, post-Mao leaders have generally adhered to a pragmatic rather than an ideological view of foreign and security policies. According to Robert Sutter, Chinese leaders must now seek to foster a better economic life for the people of China to justify their continued monopoly of political power. They cannot rely, as Mao did, on revolutionary prestige, or on the appeal of communist ideology. Furthermore, China now depends on foreign trade, and related foreign investment and assistance, for its economic development. To buttress their political survival, post-Mao leaders must consider how foreign policy will affect the continued trade, investment, and assistance so important to Chinese economic well being.[107]

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[106] Swaine, *The Role of the Chinese Military in National Security Policymaking*, 14.

[107] Robert Sutter, "China," in *Asian Security Handbook: An Assessment of Political-Security Issues in the Asia-Pacific Region*, ed. David G. Wiencek (Armonk, New York: M.E. Sharpe, 1996), 135.

Faced with the end of the Cold War, the collapse of the Soviet Union, the Gulf War, and the danger of the "new world order," the Fourteenth Party Congress in late 1992 declared that bipolarity had ended and that the international system was moving toward multipolarity.[108] In the Chinese view, this structural shift has been accompanied by a redefinition of their concept of national power. China's current strategic objectives are reflected in the "Four Modernizations" of industry, agriculture, science and technology, and national defense, through a program of incremental, market-led economic restructuring and administrative reform. Key to the modernizations is the concept of "comprehensive national strength" (CNS) composed of China's natural resources, economic prowess, external trade and investment, scientific advancement, military capabilities, and diplomatic efficacy. Under the Four Modernizations, military improvements are subordinated to the establishment of strong economic, technological, political, and social capabilities.[109]

2. The Forum for Policy Formation

Chinese statements on internal and external objectives suggest a clear linkage between domestic, economic, and foreign security interests. As the final releasing authority for foreign policy, including arms control agreements, the NSO subarena is the forum where defense, foreign affairs, and intelligence community leaders must reach concensus over which course of BTW/BWC policy will best serve Chinese strategic objectives.

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[108] Samuel S. Kim, *China's Quest for Security in the Post-Cold War World* (Carlisle Barracks, Pennsylvania: U.S. Army War College, 1996), 6.

C. THE FOREIGN POLICY SUBARENA

The foreign policy subarena, composed of civilian agencies of the State Council and the Chinese Communist Party (CCP), is responsible for political and diplomatic relations with other nations and several quasi-governmental interactions including multilateral discussions, foreign economic, scientific, and technological activities (trade negotiations, technology transfer agreements, and large equipment sales), and international security activities such as the Association of Southeast Asian Nations Regional Forum (ARF) and arms control negotiations.[110]

1. Functional Elements of the FP Subarena

The leadership, structures, and processes of the foreign policy subarena are more regularized and bureaucratic than those of the national strategic objectives arena. Major actors include six ministries and two coordinating mechanisms: the CCP Central Committee's Foreign Affairs Leading Small Group (FALSG); and within the FALSG, the State Council Office of Foreign Affairs (OFA).[111] Primary leadership authority over foreign policy is exercised by Zhu Ronghi. As State Council Premier, and head of the FALSG, Zhu is responsible for developing policy, overseeing the activities of the MoFA, and coordinating the activities of the various foreign policy bureaucracies.[112]

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[109] Senior Colonel Wang Zhongchun, PLA, *The Changes and Development of China's Peripheral Security Environment and its Defense Policy* (Carlisle Barracks, Pennsylvania: U.S. Army War College, 1996), 36.

[110] Swaine, *The Role of the Chinese Military in National Security Policymaking*, 20.

[111] Ibid., 22.

[112] Swaine, *The Role of the Chinese Military in National Security Policymaking*, 23.

2. Chinese Foreign Policy Objectives

China's current foreign policy is pragmatic and is keyed to maintaining an external environment conducive to positive political and economic relations. The FP subarena is heavily involved in BWC negotiations and addresses the inspection protocol based on how it serves or hinders its political and economic objectives. Good relations with the West, and especially the United States, are especially important: (1) to assure the continued success of economic reform, which is heavily dependent on foreign trade, technology, and investment; (2) to avoid excessive external pressures on China's military modernization program; (3) to prevent the possible emergence of a more military assertive Japan; (4) to minimize U.S. incentives for providing military assistance to Taiwan; and (5) to resolve issues of mutual concern such as arms proliferation in East Asia.[113]

Several recent initiatives by the FP subarena demonstrate the primacy of trade, technology, and foreign investment in its overall strategy. In a 25 November 1997 speech to the 5th Informal Leader's Meeting of APEC in Vancouver, Chinese President Jiang Zemin stated that "economic and technological cooperation and trade and investment liberalization are closely linked and should support each other." He cited advances in science and technology as the decisive factor in narrowing the gap between developing and developed nations and stressed that "strengthened scientific and technological exchanges as well as technological cooperation and transfer will greatly facilitate the process of trade and investment liberalization." [114] To this end, Jiang

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[113] Swaine, *The Role of the Chinese Military in National Security Policymaking*, 20.

[114] "President Jiang Calls for Wide Cooperation," in *PRC Newsletter* (Washington, D.C.: PRC Embassy, December 1997, identifier 199725, accessed 2 February 1998); available from http://www.china-embassy.org/Press/Newsletters.htm, Internet.

proposed the creation of an "Agenda for Science and Technology Industry Cooperation into the 21st Century." This plan would remove trade barriers to accelerate the transfer of high technology to developing nations, and "rationalize" the intellectual property rights (IPR) regime and its conditions of patent transfer.

Furthermore, to attract investment and technology, the Ministry of Foreign Trade and Economic Cooperation (MoFTEC) granted tax exemptions in December 1997 for foreign ventures utilizing modern agricultural technology and advanced industrial equipment. According to Minister Wu Yi, "the goal of tax readjustments initiated by the State Council is to attract increasing foreign investment, encourage the import of more advanced foreign technology and equipment, enhance the industrial structure and technological advancement, and maintain rapid, sound and sustainable national economic development."[115] MoFTEC's efforts to attract investment and technology appear to be having some success:

- According to the State Planning Commission, China has approved 300,000 overseas-backed businesses involving approximately 200 billion U.S. dollars of investment. It claims that overseas investment makes up more than 20 percent of the country's total expenditures in fixed assets.[116]
- China used more $51.9 billion of direct foreign investment in 1997.[117]
- A total of 166 overseas financial institutions now run their operations in China with total assets of $30.6 billion.[118]

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[115] "China Readjusts Tax on Imported Equipment," in *PRC Newsletter* (Washington, D.C.: PRC Embassy, 30 December, identifier 199801, accessed 2 February 1998): available from http://www.china-embassy.org/Press/Newsletters.htm, Internet.

[116] "China To Adopt New Policies for Foreign Investment," in *PRC Newsletter* (Washington, D.C.; PRC Embassy, 2 January 1998, identifier 199802, accessed 2 February 1998); available http://www.china-embassy.org/Press/Newsletters.htm, Internet.

[117] *PRC Newsletter* (Washington, D.C.; PRC Embassy, March 1998, identifier 199803, accessed 10 April 1998); available http://www.china-embassy.org/Press/Newsletters.htm, Internet.

[118] *PRC Newsletter* (Washington, D.C.; PRC Embassy, February 1998, identifier 199802, accessed 10 April 1998); available http://www.china-embassy.org/Press/Newsletters.htm, Internet.

- Overseas-funded enterprises in China now provide 17 million jobs, 10 percent of the non-agricultural working force.[119]

- James W. Jarrett, vice-president of the Intel Corporation, believes that China will be Intel's third-largest market after the United States and Japan within a few years. He reports that China is its fastest growing market and that Chinese demand for personal computers has been increasing at an average annual rate of 40 percent.[120]

- U.S. hard drive manufacturer, Seagate Technology International, expects to double its production and sales in China in 1998 compared to last year. The company currently has two production bases in China, with a total investment of $90 million. Seagate occupies more than half of China's hard disk drive market.[121]

- Last year, the United States became China's second largest trade partner, with total two-way trade reaching $42.8 billion and American capital investment reaching $14.3 billion. Imports included targeted high technology such as aircraft, production capital, and telecommunications equipment.

- China has, since 1993, ranked as the world's second largest investment target following the United States.[122]

Concurrent with promotion of trade and investment are FP subarena efforts to acquire new technology. Within the Ad Hoc Group of the BWC, China leads the non-aligned group of nations (NAG) in demands for technological and economic concessions under Article X in exchange for acceptance of inspection provisions. Article X states that participating countries "undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials, and scientific and technological

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[119] *PRC Newsletter* (Washington, D.C.; PRC Embassy, February 1998, identifier 199802, accessed 10 April 1998); available http://www.china-embassy.org/Press/Newsletters.htm, Internet.

[120] "Facts and Figures from China," in *PRC Newsletter* (Washington, D.C.; PRC Embassy, December 1997, identifier 199714, accessed 2 February 1998); available http://www.china-embassy.org/Press/Newsletters.htm, Internet.

[121] "U.S. Hi-Tech Company Making Profits in China," in *PRC Newsletter* (Washington, D.C.; PRC Embassy, November 1997, identifier 199711, accessed 2 February 1998); available http://www.china-embassy.org/Press/Newsletters.htm, Internet.

[122] "Facts and Figures," in *PRC Newsletter* (Washington, D.C.; PRC Embassy, May 1997, identifier 199711, accessed 10 March 1998); available http://www.china-embassy.org/Press/Newsletters.htm, Internet.

information for the use of bacteriological agents and toxins for peaceful purposes."[123] Among Chinese demands are the creation of a biotechnology databank, assistance with acquisition of instruments, equipment, and technologies developed by BWC members, aid in establishing national defense research centers and training of personnel in bio-defense activities, and elimination of export control regulations between participating states.[124]

3. Chinese Foreign Policy and the Effect of Sanctions

Despite increasing engagement in the world economy, the improvement of economic relations between the PRC and the West has not been welcomed by all. Some members of the U.S. congress favor re-linking economic relations with human rights, market access, and intellectual property issues. FP leaders are aware of these attitudes and must consider the affect of BWC and BTW policy on the foreign trade, investment, and technology transfer it seeks to promote. Chinese intransigence with regard to nonproliferation or evidence of duplicity revealed by BWC inspections could provide additional cause for reducing current trade benefits or the imposition of economic sanctions by the United States and world community. To predict the position that FP leaders may take in BWC negotiations in the future, the effect of past economic pressures levied against China can be explored to determine if policy trends exist.

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[123] U.S. Arms Control and Disarmament Agency, *U.S. Arms Control and Disarmament Agreements, Texts, and Histories of the Negotiations* (Washington, D.C.: U.S. Government Printing Office, 1996), 100.

[124] As with other technologies associated with BTW, those covered under Article X are dual-use and could be used to further improve both commercial biotechnology industries and offensive BTW capabilities. See Amy E. Smithson, "Man Versus Microbe: The Negotiations to Strengthen the Biological Weapons Convention," in *Biological Weapons Proliferation: Reasons for Concern, Courses of Action* (Washington, D.C.: The Henry L. Stimson Center, 1998), 117.

a) Human Rights Concerns and Sanctions

Diplomatic relations between the United States and the PRC were first established on 1 January 1979. The next decade was marked by increasing cooperation and trade including extension of most-favored-nation (MFN) status to China. The United States welcomed political and economic reforms implemented under the leadership of Deng Xiaoping. In April 1989, however, students in Beijing held demonstrations in Tiananmen Square calling for political liberalization. By June, troops were deployed to maintain order. In the course of the crackdown, hundreds of civilians were killed or wounded. To express U.S. condemnation of the government action, President Bush suspended all arms trade, military and high-level government exchanges. He also sought postponement of multilateral development bank loans. Congress followed that action with legislation restricting export licenses to China for satellites, withholding International Development Association funding, and conditionally prohibiting Export-Import Bank support of projects in China.

Today, the United States maintains sanctions against China in eight areas in protest of its handling of the Tiananmen situation. The effect of these measures in moderating China's human rights policies has been slight. Beijing considers demonstrations such as Tiananmen as a domestic issue and a direct threat to its legitimacy, and has been unwilling to compromise in this regard.[125] Furthermore, the current U.S. administration has de-emphasized human rights concerns in bilateral relations with China. Table 1 lists current sanctions.

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[125] See Gary Clyde Hufbauer and Jeffery J. Schott, Kimberly Ann Elliot. *Economic Sanctions Reconsidered*, Washington, D.C.: Institute for International Economics, 1990.

Table 1. Current U.S. Sanctions Against China

Sanction	Description
Prohibition of indirect U.S. foreign assistance to China	The 1987 Foreign Operations Appropriations Act bans indirect aid to the PRC unless the President certifies that withholding funds is contrary to the national interest.[126]
Termination of U.S. support for multilateral development loans to China except in cases of basic human need.	Since 1990, the United States has abstained from World Bank votes for loans to China that do not promote basic human needs.[127]
Military equipment and weapons trade suspended.	A ban on U.S. Government and commercial weapons sales was imposed on June 5, 1989.[128]
Prohibitions on the Overseas Private Investment Corporation and the Trade and Development Agency.	Since 1990, the Overseas Private Investment Corporation and Trade and Development Agency are forbidden to offer insurance and financing to enterprises operating in China.[129]
Nuclear trade and cooperation suspended.	The United States prohibits the transfer to China of any nuclear material, facilities, or components which could be diverted to nuclear explosive purposes under the Atomic Energy Act of 1954.[130]
Export licenses for crime control and detection equipment prohibited	Since 1990, the United States prohibits export of crime control equipment to China.[131]
Suspension of Export-Import Bank financing	The Foreign Assistance Appropriation Act of 1964 prohibits Export-Import loans to China without a President waiver of national interest.[132]
Embargo on arms and ammunition	On May 26, 1994, President Clinton placed an embargo on the import of firearms, firearm parts and ammunition from China.[133]

[126]Waivers have been issued for each of the fiscal years that China has been listed. See "China, Congress, and Sanctions," (Washington D.C.; Congressional Research Service, Report for Congress 96-348 F, 17 April 1996, accessed 10 March 1998); available http://web.nps.navy.mil/~relooney/sanct.htm, Internet.

[127]Kerry Dumbaugh, "China: Current U.S. Sanctions" (Washington D.C.: Congressional Research Service Report for Congress 94-92F, updated April 14, 1995, accessed 10 March 1998); available http://web.nps.navy.mil/~relooney/sanct.htm, Internet.

[128]Ibid.

[129]CRS, "China, Congress, and Sanctions"

[130]Dumbaugh, "China: Current U.S. Sanctions"

[131]Ibid.

[132] Waivers have been granted by the past three administrations, most recently on April 21, 1995, to allow for extension of a loan of $237 million to purchase U.S. equipment for a power plant in China. On February 28, 1996, after reports that China had was supporting Pakistan's nuclear weapons program, the Clinton Administration asked the Export-Import Bank to postpone final consideration of any new financing for U.S. companies planning to export to China. On April 16, 1996, however, an Export-Import Bank guarantee of $160 million to China's Yunnian Airlines was approved for the purchase of three Boeing jets, ending the loan suspension for China. See CRS, "China, Congress, and Sanctions."

[133] According to the U.S. Customs Service, such imports were projected to total approximately $200 million in 1994. See Dumbaugh, "China: Current U.S. Sanctions."

b) Trade Concerns

Since 1992 the United States has pursued a number of trade-related complaints against China. Disputes over market access, intellectual property rights, and exports of prison-labor goods have resulted in the negotiation of several memoranda-of-understanding (MOUs) between China and the United States. While these are not sanctions per se, they include possible retaliatory actions. The MOU negotiation process shows a pattern of willingness on the part of FP subarena leaders to compromise over trade issues unlike human rights, which it considers solely a domestic issue, and suggests that economic incentives may be a useful tool to facilitate cooperation in nonproliferation.

On 7 August 1992, the United States and China signed an MOU to ensure that products made by prison labor in China are not exported to the United States. The agreement was reached only after the Bush Administration threatened to increase U.S. Customs Service inspections of imported Chinese products, and ban the release of Chinese imports suspected of being produced by forced labor. Under the MOU, China permits U.S. Customs officials to inspect Chinese prisons suspected of producing goods for export.[134]

On 10 October 1992, the United States and China signed an MOU resolving a one-year investigation into China's trade barriers to U.S. imports which forestalled over $1 billion in retaliatory U.S. sanctions. Under the MOU, China pledged to publish its trade laws and regulations, eliminate a range of barriers including tariffs, quotas, import restrictions, import licenses, and import substitution laws, and establish a

[134] Dumbaugh, "China: Current U.S. Sanctions."

joint working group on standards and testing barriers to agricultural products. The United States, in return, pledged to support China's entry into the General Agreement on Tariffs and Trade (GATT) and reduce export controls on computer and telecommunications equipment to China.[135]

Concerns that China fails to provide adequate protection for U.S. intellectual property has been the longest-standing point of contention between the two countries. In April 1991, the U.S. Special Trade Representative's Office (USTR) accused China of violating U.S. intellectual property rights and threatened trade sanctions against certain Chinese imports. In the MOU reached in January 1992, China agreed to strengthen its patent, copyright, and trade secret laws. It also agreed to improve protection of U.S. intellectual property, including computer software, sound recordings, and chemicals. Although China reportedly made improvements in its IPR regime, U.S. officials determined that piracy of copyrighted works and trademarks continued, and pressed China to take legal action against certain Chinese companies. Chinese footdragging in 1993 and 1994 led the USTR to again threaten sanctions. On 4 February 1995, despite ongoing negotiations, U.S. Trade Representative Mickey Kantor announced that he was ordering the automatic imposition of 100 percent tariffs on over $1 billion worth of Chinese imports. As a result, an IPR accord was reached committing China to take immediate steps to address copyright piracy in China, make long-term changes to ensure effective enforcement of intellectual property rights, and provide U.S. intellectual property rights holders with enhanced access to the Chinese market.[136]

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[135]Dumbaugh, "China: Current U.S. Sanctions."
[136] Ibid.

The foreign policy subarena's involvement in diplomatic relations, economic and technological policy, and multilateral arms control guarantees its involvement in the negotiation of the BWC inspection protocol. Of the three subarenas that provide input into policy formation, it bears the primary responsibility for assuring the continued success of Chinese economic reform and promoting China's position as a responsible global economic and political leader. Zhu Ronghi was elected to the office of Premier in 1998. Previously the mayor of Shanghai, he assumed control over economic policy when Premier Li Peng suffered a heart attack in early 1993. In his five years as the country's economic tsar, Zhu has controlled inflation, forced banks to reform lending practices, and earned a reputation as a no-nonsense technocrat.[137] Given his past involvement in economic reform, he will likely approach BWC verification with the goal of maintaining political relations to facilitate continued investment and trade, while avoiding actions that would threaten these benefits or China's diplomatic standing among other major powers.

D. THE DEFENSE POLICY SUBARENA

Chinese defense activities support national security policy and China's broader national strategic objectives. DP subarena responsibilities include the formation of doctrine and strategy, and ensuring the readiness and training of Chinese armed forces. The PLA is also involved in both the formation and implementation of policies

[137]Deng Xiaoping referred to him as "one of the few cadres who really understands how the economy works." See Matt Forney, *Far Eastern Economic Review*, 5 March 1998, available http://www.feer.com, Internet.

concerning arms control, military equipment acquisition, and arms sales.[138] While cooperation in international nonproliferation regimes offers technological and political benefits, the implementation of a BWC inspection protocol threatens PLA operational security and the autonomy of defense industries. Furthermore, the record of PLA involvement in nonproliferation shows that defense and foreign policy objectives have not always coincided.

1. Elements of the Defense Policy Subarena

The formation of defense policy is the domain of the PLA. Major actors include the heads of the military departments and defense organizations, and a single coordinating mechanism: the party Central Military Commission (CMC) and its general office (CMC GO).[139] The uppermost tier of the CMC includes Jiang Zemin (as CMC chairman) and Generals Liu Huaqing, Zhang Zhen, Zhang Wannian, and Chi Haotian. Within the PLA, this five-man CMC executive committee consults with the remaining members of the CMC in formulating defense policy.[140]

Six military agencies constitute the core policy organs of the PLA. The General Staff Department (GSD), General Political Department (GPD), General Logistics Department (GLD), the Commission on Science, Technology and Industry for National Defense (COSTIND), the National Defense University (NDU), and the Academy of Military Science (AMS). Leaders of these departments form the bureaucracy responsible for executing all major operational dimensions of military policy.[141]

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[138] Swaine, *The Role of the Chinese Military in National Security Policymaking*, 37.
[139] Ibid., 41.
[140] Ibid., 43.
[141] Secondary PLA organs include the Strategic Missile Force, the PLA Air Force (PLAAF) and PLA Navy (PLAN). Ibid., 46.

The GSD functions as the headquarters of the PLA and the chief executive arm of the PLA leadership. It also is responsible for procurement, operational planning, and intelligence. While primarily an administrative entity, the GSD has the greatest input into the defense policy process. [142]

COSTIND is China's principle manager of industrial policy for technology and oversees civilian and military science and technology (S&T). It manages conventional and nuclear-weapons-related research, defense production, and space technology research. It is China's primary contact for foreign military transfers. Additionally, COSTIND is the primary bureaucracy charged with technical intelligence gathering overseas, and provides data on arms control issues.[143]

2. Defense Policy Objectives

According to June Dreyer, the PLA plays a dual role in the country's strategic deliberations: it participates in the formulation of strategy and is charged with implementing strategy. The active involvement of higher echelons of the PLA in formulating national policy sets the Chinese military apart from the Western model in which politicians decide upon policy and the military implements it.[144] The PLA, through the Defense Policy subarena, plays an important part in arms control policy, and is heavily involved in current discussions over the BWC inspection protocol to ensure that its strategic interests are served. PLA leaders' perceptions of the security

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[142] Swaine, *The Role of the Chinese Military in National Security Policymaking*, 46.

[143] U.S. Congress, Office of Technology Assessment, *Other Approaches to Civil-Military Integration: The Chinese and Japanese Arms Industries* (Washington, DC: U.S. Government Printing Office, March 1995) 10.

[144] June Teufel Dreyer, *China's Strategic View: The Role of the People's Liberation Army,* (Carlisle Barracks, Pennsylvania: U.S. Army War College, 1996), 1.

environment and how it has changed in recent years influence their position on BWC verification.

a) PLA Perceptions of the Security Environment

During the 1950s, the main focus of China's defense policy was its alliance with the Soviet Union to oppose the U.S. policy of containment. The Chinese viewed President Truman's decision to send troops to the Korean War, Seventh Fleet patrols in the Taiwan Straits, 13th Air Force assets based in Taiwan, and support for the French war in Vietnam as aggressive actions. The United States constituted the primary military threat to China from three directions: the Korean Peninsula, the Taiwan Straits, and Vietnam. In the 1960s, China faced a military threat from both the United States and the Soviet Union. [145]

During the 1970s, Sino-U.S. relations became normalized, greatly reducing the American threat to China's security. The Soviet Union, however, continued to build up its military forces in the Mongolian border area, established a naval base in Vietnam, and occupied Afghanistan in 1979. China's defense policy shifted to emphasize preparations for an overall defensive war against its communist neighbor.[146]

By 1978, Chinese leaders began to realize that even though the competition between the United States and the USSR was fierce, the world security environment on the whole was increasingly positive. In response, the Chinese shifted

[145]Beginning in 1964, the Soviet Union sent reinforcements to its Chinese border. U.S. involvement in Vietnam began to escalate in 1961. See Wang Zhongchun, Senior Colonel, PLA, *The Changes and Development of China's Peripheral Security Environment and its Defense Policy* (Carlisle Barracks, Pennsylvania: U.S. Army War College, 1996), 25.

[146]Wang, *Changes and Development of China's Peripheral Security Environment*, 29.

their defense policy from preparing for large-scale defensive war, to streamlining and modernizing their military to meet a changing threat.[147]

During the 1990s, PRC leaders saw the old bipolar structure as evolving towards multipolarity. The Chinese believe multipolarization and unbalanced development of world economic, political, and military forces are redefining the world strategic situation.[148] The end of the Soviet threat, coupled with growing engagement in international economic and security institutions, has produced perhaps the least threatening security environment facing China since the founding of the People's Republic in 1949.[149]

In today's world, PLA leaders believe that the PRC is capable of defending its own territory and that no aggressor is likely to attempt to conquer and rule mainland China. PLA leaders recognize their weaknesses, however, and remain versed in Sun Tzu's belief that the prudent general should "carefully compare the opposing army with [ones] own, so that [one] may know where strength is superabundant and where it is deficient."[150] While the PLA may be an effective conventional army, military leaders see the twenty-year gap in technology between China's weapons systems and those of the United States as a serious vulnerability.[151]

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[147]Wang, *Changes and Development of China's Peripheral Security Environment*, 29.

[148]Today's Chinese leadership sees the world security environment as more relaxed, with global war unlikely. Major powers, for the first time since the end of World War II, are not directly antagonistic and have adjusted their military strategies toward fighting regional or local conflicts and operations other than war (OOTW). Breakthroughs have been made in negotiations on arms control and disarmament, and the growing integration of the world economy is seen to constrain the outbreak of global war. See Wang, 34.

[149]Samuel S. Kim, *China's Quest for Security in the Post-Cold War World* (Carlisle Barracks, Pennsylvania: U.S. Army War College, 1996), 1.

[150]Sun Tzu, "The Art of War," trans. Lionel Giles (May, 1994, accessed 5 April 1998); available from http://home.navisoft.com/entisoft/artofwar.htm, Internet.

[151] Kim, *China's Quest for Security*, 12.

b) Addressing a Changing Threat

The PLA is implementing a "two-tier" defense modernization strategy. The first tier focuses on the improvement of the PLA's nuclear capability through the creation of a small force of strategic and tactical nuclear missiles. The modernization program is designed to provide a credible deterrent capability against both nuclear and conventional threats from the major powers, and for possible use in limited conflicts.[152]

The second tier of China's defense strategy stresses the improvement of conventional military capabilities. The Gulf War demonstrated the type of warfare the Chinese armed forces might face, triggering a doctrinal shift from the Dengist strategy of fighting a "people's war under modern conditions" to a strategy of achieving victory in local wars under high technology conditions.[153] In a speech at the Chinese National Defense University in 1998, CMC Vice Chairman Chi Haotian emphasized that to face the threat of local wars under high technology conditions "the primary task is to follow the principle of crack units, combined efforts, and efficiency."[154] The overall modernization objective of the PLA is to better equip and train the army so that it can fight and win small "low intensity" border or near-abroad conflicts involving modern precision weapons, information warfare, and combined arms doctrine.[155]

c) PLA Concerns Regarding Arms Control

The administration of a BWC inspection regime poses several threats to the CMC. Accepting the protocol means the PLA must relinquish an inexpensive force

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[152] China's official nuclear defense strategy continues to stress a "no first use" doctrine and prohibits the use of nuclear weapons against non-nuclear powers. See Swaine, *The Role of the Chinese Military in National Security Policymaking*, 38.

[153] Kim, *China's Quest for Security*, 12.

[154] "Commander Jiang Speeds Up Army Reform, Structure of Three Armed Services to be Adjusted," *Hong Kong Chiao Ching,* 16 February 1998, 14.

[155] Wang, *Changes and Development of China's Peripheral Security Environment*, 39.

multiplier and strategic deterrent, open sensitive facilities to inspection, and subject the export activities of Military Industrial Enterprises (MIE) to the scrutiny of international regulation.

No military planner can be expected to give up a potent weapon system without good reason, and the PLA certainly considers how arms control will alter the current military balance. PLA strength presently resides in its conventional capabilities, but these could be negated by the asymmetric threat of WMD, including BTW. Since several neighbors are believed to possess BTW capabilities, and given the availability of BTW to substate groups, eliminating the threat of biological weapons could only enhance China's national security.[156]

Despite Chinese denials, the U.S. government has publicly stated that it suspects that the PRC maintains an offensive BTW program. Regional neighbors acknowledge this U.S. assessment. This makes China, at the very least, a "virtual" BTW state in the eyes of its neighbors. Until the time that the BWC can detect violations of compliance, the PLA will be reluctant to give up the means to respond in kind and the inherent deterrent value of an ambiguous BTW capability.

d) Concerns Over Transparency

PLA leaders are concerned about implementation of a BWC inspection protocol because of the degree of access it will grant inspectors to military capabilities and research facilities. *The Art of War* remains an important text for the Chinese

[156] Monte R. Bullard and James A. Lamson, "China: Security and Arms Control" (Monterey, Calif.: Monterey Institute of International Studies, 1997), 4. Also, Russia, India, and North Korea all are suspected of maintaining offensive BTW programs. See "Proliferation: Threat and Response" (Washington, D.C.: Officer of the Secretary of Defense, November 1997), 5.

military, and transparency runs counter to Sun Tzu's tenets on operational security.[157] As General Liu Huaqiu has stated: "military transparency should be pursued in accordance with the principle that the security of each country will not be undermined."[158] Sun Tzu's belief in the opacity of military capabilities is further stressed by the passage: "In making tactical dispositions, the highest pitch you can attain is to conceal them; conceal your dispositions, and you will be safe from the prying of the subtlest spies, from the machinations of the wisest brains."[159] PLA leaders likely see multinational inspection teams as a mechanism for Western intelligence to "subtly pry" into some of their most sensitive areas and may attempt to limit the degree of access granted under the BWC inspection protocol.

e) PLA Military Industrial Enterprises

A fundamental idea in PLA ideology is that "the Army and the People are one."[160] The PLA has long been integrated into the development of the Chinese economy. Today, the sale of arms and related equipment is an important source of income for the Chinese economy in general and the PLA specifically. More active implementation of export controls for dual-use equipment outlined under the BWC has the potential to cut into PLA revenues.

In 1944, the Chinese had only a minimal defense-industrial base because of the agrarian nature of the Chinese economy, and the devastation wreaked by both World War II and the Chinese Civil War. The defense industrial base which developed in the 1950s was organized along Soviet lines using aid and engineers from the USSR.

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[157] Bullard and Lamson, "China: Security and Arms Control," 6.

[158] Michael Krepon, "Chinese Perspectives on Confidence-building Measures," May 1997. Cited in Bullard and Lamson, 2.

Following the Sino-Soviet split in the 1960s, the Chinese sought to develop an indigenous arms capability, and established a group of eight Ministries of Machine Industry (MMI) responsible for the electronics, aerospace, shipbuilding, nuclear weapons and energy sectors.[161] The low level of sophistication of the military industrial base in the 1960s and 1970s, coupled with the PLA's focus on the Maoist doctrine of "People's War" with its emphasis on massed infantry tactics, justified continued production of low-tech weapons and equipment.

The death of Mao and the rise of Deng Xiaoping, who took a less ideological line, changed the focus of military industry. Deng's "Four Modernizations" doctrine stressed the necessity of advancing agriculture, industry, science and technology, and national defense, *in that order.* As part of this national modernization effort, resources were shifted from military to commercial economic development. The PLA embraced this shift and tolerated short-term budget and force reductions on the premise that it would ultimately benefit from a more sophisticated national technological, industrial, and scientific base.[162] Left to fend for itself to provide resources for sustaining and modernizing forces, the PLA turned to arms exports.[163]

PLA-run arms manufacturers – notably New Era and Poly Technologies – became extremely successful. PLA entrepreneurial success, however, weakened the CCP's direct involvement in most arms exports, which the PLA views as normal business transactions. Most conventional arms transfers are handled by Poly Technologies. Units

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[159] Sun Tzu, "The Art of War," trans. Lionel Giles (May, 1994, accessed 5 April 1998); available from http://home.navisoft.com/entisoft/artofwar.htm, Internet.

[160] OTA, *Other Approaches,* 5.

[161] Ibid., 7.

[162] Ibid., 9.

[163] Although the Chinese defense budget has risen by over 10 percent annually for the past several years, resources for military modernization remain constrained.

of its sister company, New Era, which produces what are considered "sensitive exports" include the China Nuclear Energy Industrial Corporation (CNEIC), Great Wall Industrial Corporation, China Precision Machinery Import Export Corporation (CPMEIC) that makes the M-series missiles and dual-use medical equipment, and China North Industries Corporation (NORINCO).[164] Among the commercial enterprises operated by the PLA are a number of industries that would be subject to scrutiny under the BWC compliance protocol.[165]

In the past, military enterprises and trading companies have enjoyed a great deal of autonomy. Export controls in China originated as a way to measure economic activity to tax it and originally had no connection with nonproliferation policy. Accordingly, MIE activities have been been largely beyond the control of the central government and there is little evidence that Beijing has promulgated nonproliferation export controls to regulate transfer of sensitive technology.[166] Officially, export controls are the responsibility of the Ministry of Foreign Trade and Economic Cooperation (MoFTEC), but in practice, products from defense industries have never fallen under its control. Current expot control regulations concern only non-defense products. In fact, there are few specfic administrative procedures for export control. Export control decisions are made on an ad hoc basis through ministerial consulation.[167] Full

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[164] Officially, there are about 10,000 factories, trading companies and other commercial entities owned by military units. Most are concentrated in the industrial sector. PLA companies are estimated to earn as much as $1 billion a year from foreign trade. See Zachary S. Davis, "China's Nonproliferation and Export Control Policies: Boom or Bust for the NPT Regime?" *Asian Survey*, June 1995, 587, and "China's PLA: A force in big business markets," *Jane's Defence Weekly*, 17 December 1997, 18.

[165] The PLA has nearly 400 pharmaceutical factories producing about 10 percent of the country's annual output of pharmaceutical goods. The 999 Enterprise Group in Shenzhen, owned by the GLD, is the country's largest pharmaceutical company. See "China's PLA: A force in big business markets" 19.

[166] Davis, "China's Nonproliferation and Export Control Policies," 598.

[167] Weixing Hu, "China's Nuclear Export Controls: Policy and Regulations," *The Nonproliferation Review*, Winter 1994, 3.

participation in the BWC would require a major overhaul of China's export control system.[168]

To date, China has been reluctant to enter into multilateral export agreements such as the Australia Group (AG), the Zangger Committee, and the Nuclear Suppliers Group. [169] The AG is an informal forum of states whose goal is to impede chemical and biological weapons proliferation by coordinating export controls on certain microorganisms, toxins, and equipment that could be used in a BTW program. Acceptance of a verification protocol may force the PLA to accept more active monitoring of dual-use equipment and technology exports by its industrial complex. Past reluctance to join export control groups demonstrates the PLA's desire to maintain close control of its MIE.

3. The PLA's Record on Arms Control

Past PLA involvement in nonproliferation agreements could help predict future participation in BWC negotiations. Chinese arms control policies have evolved from insistence on the rights of every country to develop nuclear capabilities to gradual acceptance and more active participation in international regimes.[170] The gap between China's stated positions on nonproliferation and actual behavior shows, however, that the PLA has not been bound in the past by export restrictions initiated by the foreign policy subarena.

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[168] Bullard and Lamson, "China: Security and Arms Control," 4.

[169] Bates Gill, Testimony before the Senate Foreign Relations Committee, 8 October 1997. See also "The Australia Group," *Monterey Institute of International Studies Nonproliferation Center* [database online] (Monterey, Calif., Monterey Institute of International Studies, 10 October 1997, accessed 2 December 1997); available from http://cns.miis.edu/db/china/bwcorg.htm, Internet.

[170] Mingquan Zhu, "The Evolution of China's Nonproliferation Policy, " *The Nonproliferation Review*, Winter 1887, 40-48.

a) The Early Years

The Chinese characterize the early years of arms control primarily as an effort by the United States and the Soviet Union to prevent other nations from reaching their levels of technical sophistication. According to Monte Bullard, the 1963 Limited Test Ban Treaty (LTBT), the 1968 Treaty on the Non-proliferation of Nuclear Weapons (NPT) and the 1974 Threshold Test Ban Treaty (TTBT) all appeared to the PLA as a conspiracy on the part of the United States and Soviet Union to maintain their preponderance in nuclear capacities and to constrain Chinese nuclear weapons development. [171] China refused to join the agreements, but adopted a declared policy of nuclear nonproliferation to other countries. During the post-1978 modernization drive, however, the PLA established a pattern of exporting nuclear materials and technology to a number of nations with secret nuclear weapons programs. Examples of such sales include exports of heavy water to India and Argentina, nuclear technology to Brazil, Pakistan, Iraq, Iran, Syria, and South Africa, and a reactor sale to Algeria.[172]

b) Nuclear Nonproliferation

The first substantive Chinese involvement in nuclear cooperation was to join the International Atomic Energy Agency (IAEA) in 1984, and to endorse IAEA safeguards for is nuclear exports in 1985. Throughout the 1980s, Beijing continued to provide assurances that it did not contribute to nuclear proliferation and that it supported internationally accepted nonproliferation guidelines "in principle." Evidence began to accumulate, however, that China was helping Pakistan operate its Kahuta uranium-

[171] Bullard and Lamson, "China: Security and Arms Control," 5.

[172] Davis, "China's Nonproliferation and Export Control Policies," 589. Also see Leonard Spector, *Nuclear Ambitions: The Spread of Nuclear Weapons, 1989-1990* (Boulder: Westview Press, 1990).

enrichment plant and that Beijing had provided Islamabad with a design for a 25-kiloton implosion device and enough weapons-grade uranium to produce two weapons.[173] Furthermore, in 1989, China helped Pakistan build the PARR-2 research reactor (which uses highly enriched uranium) and helped upgrade the PARR-1 reactor in 1991. After German, Japanese, and French firms refused to sell Pakistan components, China signed a contract for a 300 megawatt reactor.[174]

China's nuclear cooperation with Iran in the late 1980s also raised questions about Beijing's commitment to nuclear nonproliferation. In 1991, Western intelligence agencies revealed that the PLA-controlled CNEIC had conducted covert transfers of reactor technology for Iran's Isfahan complex beginning in 1989. Initially, the Chinese embassy denied the allegations, but under increasing attention, finally admitted to cooperative contracts with Iran to provide a calutron and two 300 megawatt power reactors. [175]

On 9 March 1992, U.S. encouragement and increasing economic pressures led China to accede to the Nuclear Non-Proliferation Treaty (NPT). According to official Chinese statements, membership enhanced Chinese security by discouraging India, Pakistan, South Korea, and Japan from developing or enhancing their own nuclear weapons.[176] In reality, foreign policy leaders were probably motivated by several other goals:

- In the aftermath of Tiananmen, China hoped to deflect criticism of its nuclear export policy.

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[173] Davis, "China's Nonproliferation and Export Control Policies," 590.
[174] Ibid.
[175] Ibid., 592.
[176] Banning N. Garret and Bonnie Glaser, "Chinese Perspectives on Nuclear Arms Control," *International Security*, Winter 1995/96, 67.

- Signing the NPT was a step toward securing normal MFN trade status from the United States.

- NPT membership secured China's ability to purchase nuclear materials and services, particularly from France and other countries unwilling to sell to non-NPT states. The loosening of some U.S. controls on exports to China, and new reactor deals with France, Canada, Japan, Russia, and South Korea in 1994 support the utility of Beijing's signing the NPT.[177]

U.S. intelligence discovered in 1995, however, that Chinese companies had exported 5000 ring magnets to Pakistan for use in uranium enrichment in clear violation of the NPT. Public disclosure of the violation and threatened economic sanctions resulted in May 1996 Chinese pledges to the United States to institute a new national system of export controls.[178] Despite these assurances, the Central Intelligence Agency stated in a July 1997 unclassified report, that for the period July to December 1996 – after China's May 1996 pledge – that the PRC remained a key supplier of nuclear technology to Pakistan and Iran, and that Chinese scientists probably worked at Iranian nuclear facilities.[179]

To supplement the threat of sanctions and bolster the Chinese commitment to nuclear nonproliferation, the Clinton administration has pursued a policy of engagement by offering technology transfer incentives. In November 1997, President Clinton reached an agreement with Chinese President Jiang Zemin allowing the sale of civilian light water nuclear reactors to China in exchange for written pledges to end nuclear trade with Iran. (The agreement, approved by Congress in 1985, had been

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[177] Davis, "China's Nonproliferation and Export Control Policies," 592.

[178] Nuclear Control Institute, "China's Nonproliferation Words Versus China's Nonproliferation Deeds," December 1997, [online database], accessed 10 April 1998, available http://www.nci.org/nci/ib12997.htm, Internet.

[179] U.S. Central Intelligence Agency, Nonproliferation Center, *The Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions* (Washington, D.C.: Government Printing Office, 1997) 5.

delayed by China's past history of proliferation behavior.)[180] How the Agreement for Nuclear Cooperation will affect Chinese compliance with the NPT remains to be seen.

c) Ballistic Missile Nonproliferation

Missile nonproliferation became a paramount issue in U.S.-China relations in June 1991, when the United States accused PRC government-operated corporations of exporting nuclear-capable M-9 missiles to Syria, and M-11 missile technology to Pakistan, and imposed sanctions.[181] By November 1991, following a visit by Secretary of State Baker, China agreed to abide by the Missile Technology Control Regime's (MTCR) export constraints if the sanctions were lifted. At the same time, China asked that advanced fighter aircraft be restricted in addition to missiles, because their payloads exceed those of ballistic missiles. (This would have blocked the U.S. transfer of F-16 fighter aircraft to Taiwan – directly impacting China's security.) The United States did not agree to include aircraft, but sanctions were lifted on March 23, which allowed U.S. firms to transfer dual use and high technology to China.[182] Beijing's promises, however, did not end PLA exports.

On 24 August 1993, the United States again determined that China shipped M-11 missile equipment to Pakistan and again reimposed sanctions on eleven PLA-operated arms enterprises. Those sanctions were lifted on 4 October 1994, after the Chinese Foreign Minister signed a pledge not to export restricted equipment.[183] Reports

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[180] Tammy Spicer, "Searching for Common Ground," Missouri State Southern College's *The Chart*, 7 November 1997, [online database] accessed 22 March 1998, available http://www.mssc.edu/chart/110997/spot9c.htm., Internet.

[181] The M-9 and M-11 ballistic missiles are considered nuclear-capable and would be subject to MTCR controls.

[182] Wendy Frieman, "New Members of the Club: Chinese Participation in Arms Control Regimes 1980-1995," *The Nonproliferation Review*, Spring-Summer 1996, 20.

[183] Dumbaugh, "China: Current U.S. Sanctions."

of Chinese missile technology cooperation and transfers to Iran and North Korea have continued to surface and U.S.-China relations have oscillated between cooperation and confrontation.

In another series of nonproliferation initiatives, the Clinton administration may offer China access to restricted rocket technology if Beijing agrees to end missile exports to Iran, Pakistan, and other developing nations. The proposal promises expanded commercial and scientific space cooperation with China (in limited areas) if China meets conditions for joining the MTCR and controls its missile-related exports. The *New York Times* reports that the agreement may be signed when the President visits China in June 1998.[184]

According to Bullard, part of China's motivation for participation in arms control agreements has been the belief that in an increasingly multipolar world, the elimination of WMD would force a new reliance on conventional weapons, China's traditional strength.[185] Furthermore, Chinese cooperation in international arms control regimes facilitates the trade and technology transfer necessary for PLA modernization and grants the PRC firmer footing on the moral high ground in arms control discussions. The historical record of Chinese proliferation behavior, however, demonstrates reluctance on the part of PLA-controlled arms industries to adhere to arms control agreements negotiated by the MoFA. The relative autonomy of MIEs, in conjunction with lax internal export controls, has resulted in a gap between stated Chinese policy on nonproliferation and actual behavior. Evidence suggests the utility of sanctions and incentives to ensure the compliance of the defense subarena is uncertain.

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[184] "China May Get U.S. Missile Technology" (Associated Press: 18 March 1998.)
[185] Bullard and Lamson, "China: Security and Arms Control," 7.

E. STRATEGIC RESEARCH, ANALYSIS, AND INTELLIGENCE SUBARENA

The Strategic Research, Analysis, and Intelligence (SRAI) subarena supports decision-makers in the foreign and defense policy subarenas and the NSO subarena. SRAI provides recommendations on political, economic, technological, and military developments, in addition to preparing country-specific military studies and input into weapons procurement and arms control policies.[186] SRAI representatives play an important role in the BWC negotiation process. They see participation in on-site inspections as a valuable new collection opportunity.

1. Functional Elements of the SRAI Subarena

This "national research bureaucracy" includes a range of institutes attached to major organs of either the foreign or defense policy subarenas.[187] The most significant civilian SRAI agencies are subordinate to the Ministry of State Security (MSS), the Ministry of Foreign Affairs (MoFA), and the Xinhua News Agency.

a) The Ministry of State Security

The Ministry of State Security (MSS) is China's primary human intelligence (HUMINT) agency. The MSS fields case officers under both official government covers, and nongovernment covers. Official covers have included diplomats, trade and industry figures, commercial officers, military attaches, journalists, scientists, and students. [188]

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[186]Swaine, *The Role of the Chinese Military in National Security Policymaking*, 57.

[187]Ibid., 58.

[188]Nicholas Eftimiades, *Chinese Intelligence Operations* (Annapolis, Maryland: Naval Institute Press, 1994), 17.

Civilian research agencies, like the MSS, provide reports on behalf of their parent organizations, for submission to the FALSG and PBSC. Their military counterparts provide similar resources to the defense policy subarena and some input into the national strategic objectives and foreign policy subarenas. The most significant military research agencies are subordinate to the MND, the GSD, and COSTIND.[189]

b) The Military Intelligence Department

The Military Intelligence Department (MID) of the PLA's General Staff Department (GSD) is the second largest organization in the PRC involved in HUMINT collection. It provides tactical, strategic, and technological intelligence to the military command structure. The MID's Bureau of Science and Technology (BST) is tasked specifically with research, design, and technical exploitation. Eftimiades concludes that the existence of the BST indicates that Chinese military intelligence is involved in espionage directed against foreign science and technology. [190]

2. SRAI information objectives

The PRC is a regional rather than global military power, and focuses less on the international security environment than nations with global commitments. The PRC's perception of threats dictates the information requirements levied on its intelligence services. It has, therefore, little to gain from intense intelligence collection and analysis of activities directed at global alliances outside its region of influence.[191] Accordingly, the PRC continues to focus its intelligence collection on issues that affect its internal

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[189]Eftimiades, *Chinese Intelligence Operations,* 64.

[190]Ibid., 84.

[191] Nicholas Eftimiades, *China's Ministry of State Security: Coming of Age in the International Arena,* Occasional Papers in Contemporary Asian Studies Number 2-1992(109) (College Park, Maryland: School of Law, University of Maryland, 1992) 5.

stability, regional security, technological and economic development, and military modernization.

The PBSC promulgates policies that serve its military, political and economic self-interest. Primary among these interests is the realization of economic and technological benefits of close ties with advanced industrialized nations. China's SRAI services are playing an increasingly greater role in supporting these national policy objectives by targeting and exploiting the technological and economic infrastructures of many modern industrialized nations.[192] Beijing has set aggressive goals to develop biotech applications ranging from new medicines, diagnostic products, vaccines and gene therapies to the genetic engineering of plants and animals.[193] BWC inspections will provide a new source of access to modern pharmaceutical and biotechnology.

3. Operations Against Foreign Technology

Public exposure of PRC intelligence activities in Taiwan, Japan and the United States demonstrates that SRAI agencies have actively tried to steal foreign military and commercial technology. Furthermore, increasing participation in multinational nonproliferation inspection regimes may indicate that the SRAI community sees BWC inspections as a new potential collection opportunity.

a) Nuclear Technology

In the past, SRAI agencies have acquired nuclear weapons technology by sending scientists overseas on scholarly exchange programs. Reportedly, the information China used to produce the neutron bomb detonated in 1988 was obtained through

[192]Eftimiades, *Coming of Age*, 5.

Lawrence Livermore National Laboratory. In a recently released Government Accounting Office report to Congress, investigators concluded that between 1994 and 1996, the Department of Energy failed to conduct background investigations on hundreds of Chinese scientists and visitors to the nation's top three nuclear weapons laboratories.[194] According to the report, of the 1,464 visitors from China during the period, fewer that 2 percent were checked. Subsequent review by the FBI showed that some of the visitors without background checks had intelligence connections and that visitors had been given after-hours access to laboratories and classified information in open workshops.[195]

In a unrelated 1997 investigation by the FBI's Foreign Counterintelligence Squad, U.S. physicist Peter Lee was arrested for providing the Chinese government with classified technical information relating to his job at Los Alamos National Laboratory. Lee, a laser energy expert, passed information relating to nuclear weapons while lecturing in China as a research scientist for TRW. In a plea bargain he admitted to espionage activities from 1985 to 1997 and received 15 years in prison and a $250,000 fine.[196]

b) Commercial Technology

Senior U.S. officials have agreed publicly that China is the most active foreign power engaged in the illegal acquisition of American commerical technology. According to Senator Richard Shelby, chairman of the Senate Select Committee on Intelligence, "China is trying to make a great leap forward, technologically speaking,

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[193] In 1986, Deng Xiaoping listed biotechnology as one of the top priorities of China's industrial development program. See Trish Saywell, "Customized Genes," *The Far Eastern Economic Journal*, 7 May 1998.

[194] The report was commissioned by the House National Security Committee in response to an 80 percent increase in the number of visitors to Lawrence Livermore, Los Alamos, and Sandia Laboratories from the mid-1980s to the mid-1990s. See Eftimiades, *Coming of Age,* 16.

[195] Associated Press, (Washington), 31 Oct 1997

and it has great needs for information, especially in the high-tech field. This is going to be an ongoing challenge for both law enforcement and business."[197]

Chinese clandestine collection operations in the United States have expanded to the point that approximately 50 percent of almost 900 illegal technology transfer cases documented annually are attributed to the Chinese government.[198] Chinese industrial espionage is believed to run the gamut from routine competitive intelligence gathering at trade shows to the theft of company trade secrets from offices and labs with computers, defense, and biotechnology topping the list of targeted industries.[199] Geographical regions targeted include Silicon Valley, Detroit, North Carolina's Research Triangle Park, and the Pennsylvania-New Jersey area, where many pharmaceutical and biotechnology firms are based. For example, in 1993, a Chinese spy was apprehended trying to steal cell cultures used in producing Epogen from Amgen, a biotechnology firm based in Thousand Oaks, California. Epogen, used to treat anemia and kidney dialysis patients, has become a $1.2 billion-a-year drug.[200] Losses from the theft of intellectual property cost U.S. companies more than $300 billion in 1997, according to a survey of the American Society for Industrial Security.[201]

c) Participation in Nonproliferation Regimes

Elements of the SRAI subarena have taken an interest in several nonproliferation regimes. Participation in multi-national inspection teams allows access to sensitive commercial and military research facilities in both scheduled and challenge

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[196] Reuters "U.S. physicist gives classified information to the Chinese," 08 December 1997.

[197] Edward A. Robinson, "China's Spies Target Corporate America," *Fortune* online, 30 March 1998, accessed 5 April 1998, available http://www.pathfinder.com/fortune/1998/980330/chi.html, Internet.

[198] Eftimiades, *Coming of Age*, 16.

[199] Robinson, "China's Spies Target Corporate America," 5.

[200] Ibid.

[201] Tom Lowry, "Secrets at Stake," *USA Today*, 28 January 1998, IB.

inspections. Since the PRC intelligence community has his used academics and scientists traveling abroad as collectors, experts of the caliber required by BWC-sponsored teams would be ideally placed to collect technical secrets and proprietary industrial information.

COSTIND primarily conducts research and analysis on specific weapons-related issues, and has taken the lead in studies on disarmament, arms control, and weapons development. COSTIND also directs an Arms Control and Disarmament Program that sponsors seminars on arms control and conveys technical information to the Ministry of Foreign Affairs and agencies of the defense policy subarena. Approximately half of the current Chinese delegation to the UN Conference on Disarmament (CD) in Geneva is composed of arms control specialists from COSTIND.[202]

Most recently, Chinese experts in chemical and biological weapons have taken an active role in CWC inspections and UNSCOM operations in Iraq.[203] While the exact composition of Chinese teams is not known, the precedent for participation in compliance protocols has been set. The UNSCOM mission in Iraq has been called the most intrusive inspection regimen ever undertaken, and lessons learned will certainly be applied to challenge inspection procedures under the BWC.

The example of Chinese scientific delegates at a Paris trade show dipping neckties into a photo-processing solution to obtain samples for exploitation is often cited as an amateurish attempt at industrial espionage.[204] In truth, similar simple collection techniques and those sampling procedures used in compliance inspections could be employed to covertly obtain proprietary information from biotechnology and

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[202] Swaine, *The Role of the Chinese Military in National Security Policymaking*, 70.

[203] The first team of Chinese experts was sent in February 1998. See Tucker, 14-15 March workshop.

[204] Robinson, "China's Spies Target Corporate America," 7.

pharmaceutical facilities. SRAI Subarena organizations have been tasked to acquire the latest biological and pharmaceutical technology. Participation in intrusive on-site inspections under the auspices of a BWC inspection protocol potentially provides easy access to this information.

F. RELATIVE INSTITUTIONAL INFLUENCE

Negotiations over BWC verification procedures fall into a grey area of foreign policy not purely diplomatic, military, or technological. PRC government documents list responsibility for formation of nonproliferation policy under agencies of the foreign policy, defense, and intelligence subarenas. To predict the likely course of future Chinese nonproliferation behavior, an assessment on the relative influence of the three subarenas in the BWC policy process must be made.

Davis asserts that elements of the foreign policy subarena (specifically the MoFA and MoFTEC) play a role in nonproliferation decision making, but are relatively weak institutional actors.[205] This position is supported by the historical record of PLA-MIE export behavior despite MoFA statements supporting nonproliferation. Both stated responsibilities and past evidence suggests that the SRAI subarena plays only a supporting role in formulating nonproliferation policy. It probably exerts some influence, however, through its technical studies and recommendations provided to decision makers in the DP and FP subarenas. The exact degree of influence wielded by each institutional group in the BWC policy process is difficult to measure. Table 2 summarizes the

[205] Davis bases this assessment on interviews with MoFTEC officials. See "China's Nonproliferation and Export Control Policies," 600.

positions of the three subarenas on BWC verification and an estimation of their relative influence in the policy process.

Table 2. Chinese Institutional Involvement in BWC Policy Formation

Institutional Subarena	Priorities	Potential benefits	Potential costs	Relative Influence in Nonproliferation Policy Formation
Foreign Policy	(1) Political and diplomatic relations (2) Economic development (3) Industrial modernization	(1) Trade (2) Foreign investment (3) Technology transfer under Article X	(1) Possible economic sanctions	Secondary*
Defense	(1) External defense (2) Nuclear modernization (3) Conventional forces modernization	(1) Improvements to BTW defenses (2) Reduced BTW threat	(1) Operational Security (3) BTW capability and deterrent. (3) MIE autonomy	Primary*
Strategic Research, Analysis and Intelligence	(1) Acquisition of advanced technology	(1) Access to pharmaceuti-cal and biotech facilities (2) Technology transfer under Article X	(1) SRAI facilities may come under scrutiny.	Supporting*

(* Relative influence is unclear. This hierarchy is based on Davis's assessment. See "China's Nonproliferation and Export Control Policies," 600.)

VI. CONCLUSION AND FINDINGS

Efforts to control the use and proliferation of BTW can be traced to the 1925 Geneva Protocol and 1972 Biological and Toxin Weapons Convention. These agreements have been largely unsuccessful because they lack a mechanism to verify compliance. Changes in the international security environment over the last decade, in combination with technical advances in biotechnology also have made BTW an increasingly attractive weapon for developing nations and substate groups.

Negotiations to strengthen the BWC with an inspection protocol to confirm compliance are ongoing in Geneva. While a "rolling draft" proposal addressing procedures for compliance monitoring exists, members of the Convention remain split over the issue of intrusive inspections. Debate in the United States is divided between arms control advocates, who believe inspections will be useful in promoting compliance and detecting violations, and those who argue that the nature of BTW and their production make verification impossible and pose serious risks to U.S. industrial competitiveness. Neither side, however, considers the likely effects of U.S. participation in inspections on the behavior of other Convention parties – especially those in violation of the BWC.

The PRC presents U.S. policy makers with a dilemma. Despite its membership in the BWC since 1984 and an official policy denying possession of BTW, U.S. intelligence agencies suspect that the Chinese maintain an offensive BTW program. Limiting the further proliferation of WMD, and especially BTW, is an important priority for the United States and allies. It is therefore important to consider the likely effects of U.S.

participation in a BWC inspection regime on the institutions that formulate Chinese arms control policy.

When security, economic, and political considerations affected by a BWC inspection protocol are applied to Swaine's model of Chinese foreign policy decision making, interests of the defense policy, foreign policy, and strategic research, analysis, and intelligence subarenas are brought into conflict. These subarenas consider different aspects of the external environment when calculating the potential costs and benefits of any particular course of foreign policy. It follows that U.S. foreign policy alters the constraints and pressures exerted on Chinese bureaucracies and may affect outcomes of the overall policy formation process.

The U.S. delegation to the Ad Hoc Group still lacks a formal position for negotiation of a BWC inspection protocol. Within the U.S. government, neither the Defense Department nor intelligence community believes that a BWC verification protocol will provide sufficient compliance information to warrant the risk of possibly compromising U.S. defense and trade secrets. U.S. industry, supported by the Commerce Department, fears losing revenues and proprietary information. Officials at the State Department are concerned that the BWC will impinge upon export control policies.[206] The Arms Control and Disarmament Agency and most in the U.S. Congress believe that an inspection protocol may provide useful information, but cannot stand alone to ensure compliance. According to interim data, the only strong believers in the utility of on-site

[206] Amy E. Smithson, "Man Versus Microbe: The Negotiations to Strengthen the Biological Weapons Convention," in *Biological Weapons Proliferation: Reasons for Concern, Courses of Action* (Washington, D.C.: The Henry L. Stimson Center, January 1998), 119.

inspections in providing accurate compliance data are staffers on the National Security Council.[207]

Given the incomplete status of the rolling text protocol and the lack of consensus with regard to the utility of intrusive inspection for BWC compliance within the U.S. government, American participation in an inspection regime cannot be assumed. Three potential U.S. courses of action are possible:

> (1) The United States could accept the protocol with an understanding of the limitations of inspection for verifying compliance.
>
> (2) The United States could neither accept nor reject the protocol; negotiations over procedural details continue.
>
> (3) The United States could reject the protocol.

The course of action that the United States decides to follow will alter the perceived costs and benefits of BWC inspections for Chinese governmental organizations and could affect the overall direction of their policy.

A. U.S. ACCEPTANCE OF THE BWC INSPECTION PROTOCOL

The U.S. executive branch may gain the support of the Department of Defense and industry, and push for acceptance of an intrusive inspection protocol as part of a larger arms control endeavor. This course of action would coincide with recent attempts to engage China in nuclear and ballistic missile arms control.

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[207] Smithson, "Man Versus Microbe," 119. Information collected by the author in a series of interviews with government officials in Washington, D.C., between 13 and 16 April, 1998, supported Smithson's observations.

1. Foreign Policy Subarena Recommendations

The MoFA and FALSG would probably consider American acceptance of the protocol as an indication that Chinese participation would be expected. Foreign policy bodies would view Chinese refusal to accept the protocol as potentially impeding continued economic engagement and the trade, investment, and aid required for growth and internal stability.

Technological exchange and training provisions under Article X of the BWC will certainly be linked to acceptance of the protocol. Refusal to join would also deny the Chinese pharmaceutical and biotechnology industries the potential benefits of Western research and development. This is a significant consideration given the size of the Chinese population, the unsophisticated PRC health care system, and the desire of party leadership to raise standards of living to legitimize their system of government.

China has long considered itself "the Middle Kingdom" and is striving to reaffirm its leadership position in the region and achieve recognition as a rising world economic and political power. Increasing involvement in multilateral economic and defense agreements serves the Chinese purpose in this regard by demonstrating good will and cooperation to the international community. Given China's long-stated position against possession of BTW, refusal to accept an inspection protocol could weaken the PRC's regional leadership role and undermine diplomatic progress made in the last decade.

Leadership in the foreign policy subarena likely considers the benefits of accepting inspections as part of a BWC compliance protocol to be greater that the potential costs. To maintain a benign political and economic environment, foreign policy decision-makers will probably recommend dismantling or converting any existing

offensive BTW programs to civil or commercial use permitted under the BWC. Discovery of past duplicity could reduce Chinese credibility within the BWC, but would be difficult to prove, given the dual-use nature of BTW. Should the United States accept an intrusive inspection protocol, the foreign policy subarena will likely recommend that the PRC also participate rather than risk political and economic isolation.

2. Defense Policy Subarena Recommendations

PLA leaders will view American acceptance of an inspection protocol as challenging military operational secrecy and autonomy, while to a lesser degree offering the possibility of reducing threats and qualitatively improving PLA capabilities.

The intrusive nature of challenge inspections will subject PLA facilities to an unheard of degree of transparency and could reveal capabilities and weaknesses to potential adversaries, including the United States. Furthermore, inspections and export controls on dual-use materials and equipment delineated under the BWC compliance protocol could subject PLA military industrial enterprises (MIE) to unwanted scrutiny and threaten lucrative export contracts. If PLA senior leadership is held accountable for MIE actions under international export monitoring provisions, violations such as those in the ballistic missile and nuclear areas will be more difficult to deny responsibility for.

The PLA likely considers its BTW as a deterrent to BTW use by Russia and other nations which have the same capability. The defense subarena would therefore be reluctant to remove a potent weapon from its arsenal. In the future, a less threatening security environment and improvements to its own nuclear capabilities could conceivably lessen the degree to which BTW figure into the Chinese deterrent calculus. Since the PLA has shifted its focus toward fighting "local wars under high technology conditions"

and improving its conventional capabilities, the elimination of the asymmetric BTW threat may, in theory, also enhance PLA traditional strengths.

The only immediate benefit for the PLA from accepting BWC inspections, however, would be in the area of BTW defense. Under Article X, provisions are made for transferring biological defense technology and training. Since improved defenses reduce an opponent's potential advantage in employing BTW, the likelihood of their use is lessened. This defensive technology is, however, dual use and could be used to develop more effective offensive BTW capabilities.

PLA leadership must balance the significant costs of transparency and losing both a deterrent and force multiplier against the benefit of acquiring BTW defensive technology. PLA leaders are therefore probably unlikely to lobby for accepting intrusive inspections. If the DP subarena does accept the protocol it will be with the understanding that BTW capabilities could be rapidly reconstituted if necessary in the future, and that this fact in itself has inherent deterrent value.

3. Strategic Research, Analysis, and Intelligence Subarena Recommendations

The strategic research, analysis, and intelligence subarena would most likely welcome U.S. acceptance of BWC inspections and recommend that China participate as well. Reciprocal provisions in the protocol would guarantee that elements of the Chinese intelligence community be included in multinational teams. These teams would be granted access to the facilities and technologies that this subarena most actively targets. Transparency is a two-sided coin, however, and while SRAI elements involved in BTW research would also be subject to scrutiny, the level of Chinese pharmaceutical and

biotechnology remains well below that of the West. The SRAI subarena stands to gain more that it has to lose in BWC inspection participation.

4. Most Likely Chinese Reaction

Should the United States agree to accept the BWC inspection protocol, the costs to the dominant defense interest may be closely balanced by the benefits in the political, economic, and technological areas. Chinese behavior would be dependent upon the ability of the FP subarena to convince PLA leaders that spillover benefits of continued economic engagement for defense exceed the potential costs of transparency. This would not be an easy task. National leaders' emphasis on "comprehensive national strength, however, supports the case that economic growth and stability are prerequisites of military strength, and that improvements to the Chinese industrial base further serve PLA modernization. In the end, it is possible that the PLA might accept transparency measures, in hopes of eventually benefiting from continued trade, investment, and technology transfer that cooperation in arms control facilitates.

B. NEGOTIATIONS OVER PROCEDURAL DETAILS CONTINUE

A second course of U.S. action would be to abstain from either accepting or rejecting a BWC inspection protocol. Within the Ad Hoc Group, the non-aligned nations have held fast to a 2001 deadline for presenting the completed inspection protocol for a general vote. Debate over details of compliance measures has been ongoing since 1991, and the draft protocol remains far from complete.

1. Foreign Policy Subarena Recommendations

Should the United States choose not to commit to the BWC inspection protocol, or if negotiations over procedural details continue past the set deadline, the PRC foreign policy subarena would likely recommend maintaining the status quo. Without means for verifying compliance, accusations of clandestine Chinese BTW programs cannot be proven. The risk of violations being exposed is minimized, and the United States and international community are unlikely to link economic issues to suspicions that can be easily denied. Should exports in violation of the BWC be discovered, sanctions would likely be levied only against individual companies or enterprises, minimizing damage to the overall Chinese economy. Foreign policy subarena elements would continue to participate in Ad Hoc Group negotiations and attempt to reap the benefits of Article X provisions in exchange for agreement to *non-intrusive* or limited inspection measures only.

2. Defense Policy Subarena Recommendations

PLA leaders would welcome a neutral American position on BWC inspection. If the BWC remains toothless, opacity is maintained and Chinese BTW programs could continue unimpeded. Elements of the defense policy subarena would undoubtedly remain involved in the BWC negotiation process to ensure that their interests are represented and to monitor proposed inspection procedures (and devise ways to circumvent them.)

Without the export restrictions of an inspection protocol, the PLA would maintain authority over its MIE's and likely continue sales of BTW related equipment. Furthermore, while the PLA may deny BTW programs and stockpiles, public statements

of U.S. suspicions have made China, at the very least, a "virtual" BTW power. Potential adversaries must acknowledge the capability of the Chinese to produce BTW. The ambiguity allowed by the absence of BWC inspections is a strong and inexpensive deterrent.

3. Strategic Research, Analysis, and Intelligence Subarena Recommendations

The PRC research, analysis and intelligence community stands to lose a significant collection opportunity from American indecision over BWC inspection. Without an inspection protocol, its own involvement in BTW development is shielded from disclosure. American non-participation in the protocol, however, denies the SRAI subarena access to American biotechnology and pharmaceutical industries.

4. Most Likely Chinese Reaction

If the United States government cannot reach a consensus to either accept or reject intrusive inspections as part of a BWC compliance protocol, Chinese delegates will try to prolong negotiations indefinitely. China will likely continue to advocate nonproliferation while circumventing prohibitions of BTW possession and transfer. A non-verifiable BWC best serves the overall Chinese strategic interest. The Chinese would be free to continue clandestine production, while enjoying the economic and political benefits of improving international relations. BWC delegates will continue to stress Chinese leadership in non-proliferation, the adequacy of non-intrusive compliance monitoring measures, and the necessity of defensive Article X assistance to the developing world.

C. U.S. REJECTION OF THE BWC INSPECTION PROTOCOL

If the U.S. Department of Defense, the intelligence community, and industry can convince proponents of the protocol that the costs of intrusive inspection outweigh the value of the information produced, or if the non-aligned group is successful in weakening the protocol to the point of being ineffectual, the United States could opt to reject inspections outright. While this is probably the least likely course of action, given the commitment the U.S. government has made to strengthening the BWC, it should be considered.

1. Foreign Policy Subarena Recommendations

China and the United States participate in several multinational arms control agreements (including the NPT, CWC, and the UNSCOM mission in Iraq) which provide for inspections to monitor compliance. The Chinese foreign policy subarena would likely consider U.S. rejection of compliance monitoring under the BWC a serious departure from past American policy and work to limit the negative diplomatic and economic consequences.

It may be in the foreign policy subarena's best interests to limit the intrusiveness of BWC inspections, but not to the point that it results in withdrawal of nonproliferation incentives. FP leaders would accept U.S. rejection of the protocol, but would likely seek to maintain bilateral BTW nonproliferation ties with the United States and other major powers (as they have done in the ballistic missile and nuclear areas). This would facilitate the continued exchange of treaty assurances for economic and technological payoffs.

2. Defense Policy Subarena Recommendations

PLA leadership would likely welcome outright American rejection of the inspection protocol. Without a forum to address BWC violations, accusations could only be aired before the UN Security Council, of which China is a permanent member with veto power.[208]

3. Strategic Research, Analysis, and Intelligence Subarena Recommendations

Should the United States reject an intrusive inspection regime, the SRAI subarena stands to lose not only collection opportunities, but also the benefits of *legal* transfers of advanced technology. Incentives play a large part in promoting compliance in arms control efforts such as the NPT and MTCR. Article X of the BWC encourages scientific exchange between participants. Since the United States leads the world in biotechnology and pharmaceutical innovation, American withdrawal would remove a potentially rich resource.

As concerns over espionage become more widespread, industry also is increasing security measures, complicating clandestine foreign collection efforts. U.S. rejection of inspections could further heighten awareness of the espionage threat. This course of action therefore, threatens two primary sources of SRAI information. To keep these information channels open, subarena leaders would likely encourage accommodation on the part of policy makers.

4. Most Likely Chinese Reaction

American rejection of BWC inspection provisions could adversely affect the interests of SRAI subarena by limiting access to technology and to a lesser degree, foreign policy institutions by threatening to cool economic and political relations. Without U.S. participation, however, it is highly unlikely that the PLA could be persuaded to accept inspections. U.S. withdrawal from the protocol would result in the creation of two groups within the BWC: those who accept inspections and those who do not. Faced with this possibility, PRC negotiators would continue to resist intrusive inspections but would work to keep channels with the United States and other non-signatories open. China would likely pursue limited bilateral BTW agreements with the goal of securing economic or technological incentives.

[208] Without an inspection protocol this an suspecting nation's only avenue for redress. It has been exercised

D. IMPLICATIONS FOR U.S. POLICY – ENGAGING CHINA IN THE BWC

It appears that of the three possible courses of U.S. action, only the first offers the chance of leading the PRC into a BWC inspection protocol. Table 3 summarizes findings.

Table 3. Findings

U.S. course of action	Likely Chinese reaction	Implications
Accept inspection protocol	Outcome uncertain	U.S. acceptance may encourage Chinese participation in BWC inspections.
Continue negotiations	Reject inspection protocol	No change to current BTW/BWC policy
Reject inspection protocol	Reject inspection protocol	No change to current BTW/BWC policy

While Chinese agreement to a protocol may be possible under the first course of action. Exact outcomes are difficult to predict without an accurate measure of relative institutional influence in the decision-making process. American participation in inspections will, however, have an impact on the Chinese institutional cost-benefit calculation and could tip the scales against the defense interest. The Chinese reaction in the last two cases can be predicted with a higher degree of certainty. If the United States fails to reach a decision over inspections, or rejects the protocol altogether, China will most likely reject it as well.

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only once: in 1997, Cuba accused the United States of spraying its sugar crop with an damaging plant disease. Nothing came of the proceedings.

The proliferation of biological weapons is a global problem that will require a concerted international effort to control. Without a means to monitor compliance, the BWC will remain toothless and BTW proliferation will continue. As BTW spread to developing nations and non-state actors, the possibility that they will be used in conflict increases.

International *nuclear* safeguards have been likened to the medieval development of the handshake; extending ones empty sword hand demonstrated peaceful intention by decreasing offensive potential and increasing vulnerability.[209] But since men often wore both a sword *and* a dagger assessable to the left hand, the handshake did not make one absolutely incapable of surprise attack. While this metaphor was originally derived to describe arms control agreements for nuclear weapons, it applies even closer to current efforts to control biological and toxin weapons. The institution of an intrusive inspection regime for the BWC is like the handshake, in that it demonstrates good intentions, increases confidence, and may encourage more responsible behavior. Inspections have costs and limitations, however, and cannot completely eliminate the possibility of surprise.

The growth of the PRC and its past record in WMD proliferation necessitate its active involvement in the BWC. If the United States is serious about BTW nonproliferation, the only chance of engaging China in the process may be to push forward and implement an inspection protocol. While expensive and not a stand-alone solution to the problem of BTW proliferation, onsite inspections would be a step toward

[209] J. Christian Kessler, *Verifying Nonproliferation Treaties: Obligation, Process, and Sovereignty* (Washington, D.C.: National Defense University Press, 1995), 11.

improving the regime, and in the long term may encourage suspected BWC violators, such as China, to accept international norms of responsible behavior.

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